

CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.
Published by the MacLean Publishing Company, Limited, Toronto, Canada

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\$3.00 per year.



A black and white illustration of a man in a suit and tie, leaning forward and pointing with his right hand towards a collection of drill bits. The drill bits are arranged in a row on a surface. Above the man, there is a diamond-shaped logo with the letter 'C' inside. To the right of the man, the text 'Just try these they're' is written in a large, bold, serif font, with an arrow pointing down to the word 'CLEVELAND' which is written in a stylized, outlined font. Above the word 'CLEVELAND' is a small illustration of a drill bit. In the top right corner of the advertisement, there is a circular library stamp that reads 'LIBRARY JUN 16 1922 UNIVERSITY OF TORONTO'.

THE CLEVELAND TWIST DRILL CO., Cleveland. New York, Chicago

Agents for Europe, CLEVELAND TWIST DRILL CO. (GREAT BRITAIN), Ltd., 36-37 Upper Thames St., London E.C. 4.

You can't help noticing the good qualities of Pratt & Whitney Taps

Their free cutting qualities, their extreme accuracy and their extraordinary ability to outlive others distinguish them.

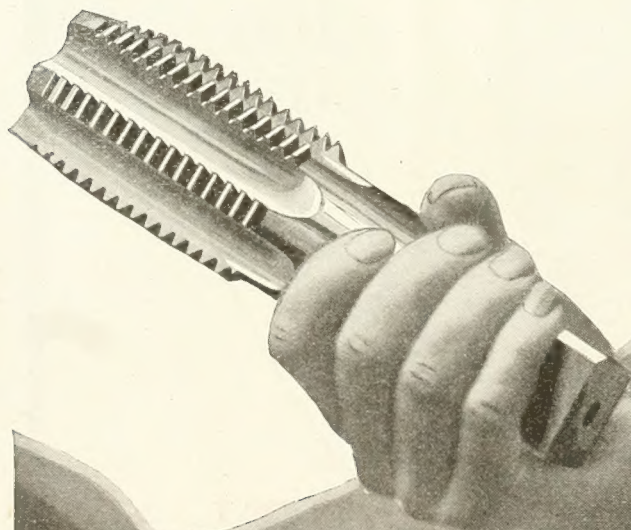
The con-eccentric relief—a distinctive P & W feature—is the secret of their goodness. One-third of the cutting edge is concentric. The remaining two-thirds has eccentric relief. Taps can be sharpened at the only correct point—on the face of the cutting edge. Sharpening in no way affects their size.

Yes, they cost a little more than some others, but they're well worth the difference. Carried in stock as are all other P & W Small Tools at our sales offices and agencies as listed.

**PRATT & WHITNEY COMPANY
OF CANADA, LIMITED**
Works: DUNDAS, Ontario

MONTREAL TORONTO WINNIPEG HALIFAX VANCOUVER
723 Drummond Bldg. 1002 C.P.R. Bldg. 1205 McArthur Bldg. Davidson Bldg. B.C. Equipment Co.

"Some Tap"



PRATT & WHITNEY

The BERTRAM MACHINE TOOLS Page



No.4 Single Punch and Shear 12" Throat Motor Drive through belt

Fitted with Plate Shearing Attachments

Capacity

- To punch 1" hole through 1" Plate
- To shear 1" Plates
- To " 6"x1" Flat Bars
- To " 1 3/4" Round Bars
- To " 4x4x3/8" Angles

**The John Bertram
& Sons Co., Limited**
DUNDAS. ONTARIO.

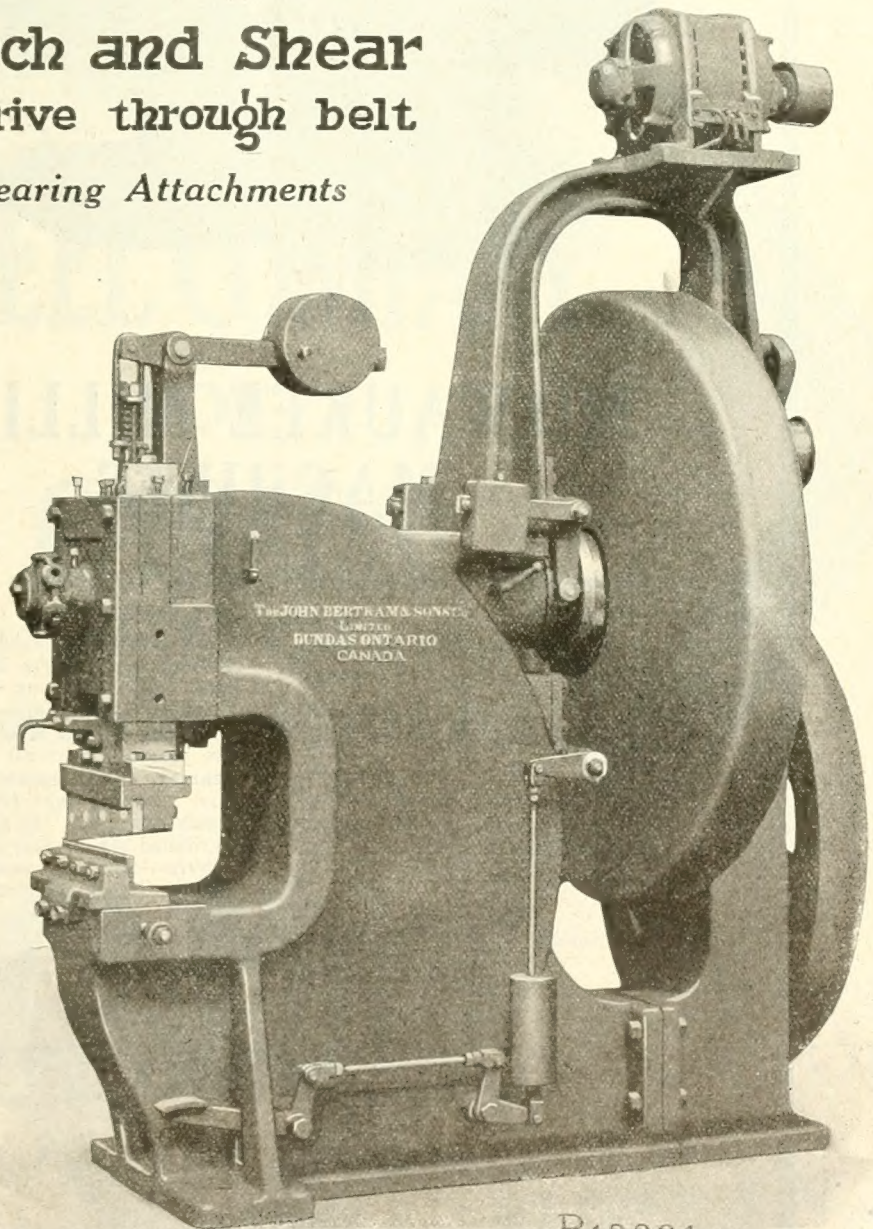
MONTREAL
733 Drummond Bldg.

TORONTO
1002 C.P.R. Bldg.

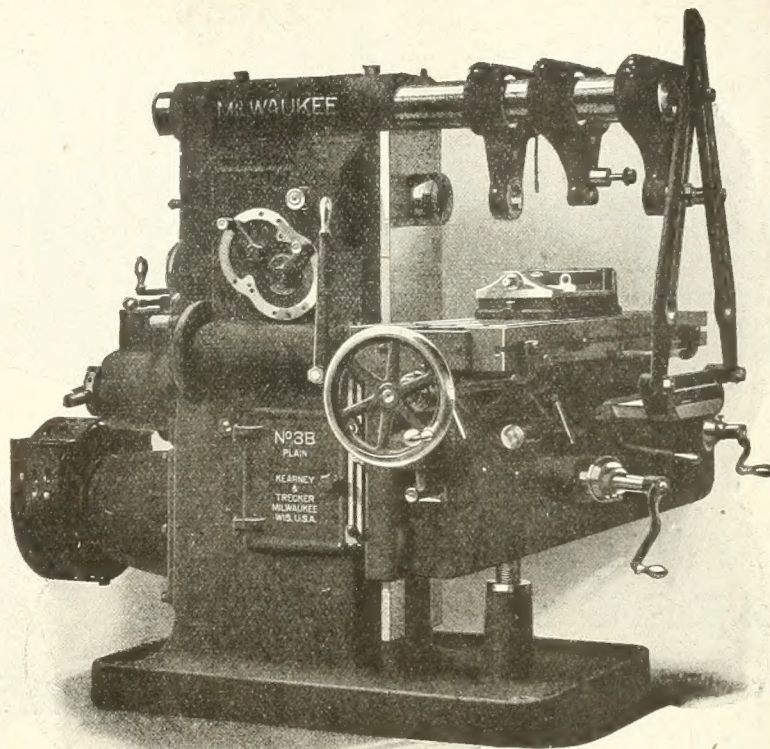
VANCOUVER
609 Bank of Ottawa Bldg.

WINNIPEG
1205 McArthur Bldg.

HALIFAX
Davidson Building



P12224



MILWAUKEE MILLING MACHINES

Double Overarm maintains alignment.

It is impossible for the operator to place the arbor supports on the arbor and double overarm in any other way than in line. Arbor cannot be pounded out of line when using large, coarse pitch cutters on rough, heavy work.

Other Distinctive Milwaukee Features:

Solid top knee—hardened steel gearing and shafts in the column and feed box—automatic flooded lubrication—one and one-half gallons of oil per minute pouring over all gears and bearings in the column and feed box, insuring lubrication at all times—flanged spindle with hardened steel collar for driving arbors—constant speed drive, reverse being self-contained.

Send for our No. 21 Catalogue. Illustrating and describing Milwaukee Milling Machines and accessories in detail

KEARNEY & TRECKER CO.
MILWAUKEE, WIS. U.S.A.

By Product Coke

Hamilton Pig Iron

Open Hearth
Steel Billets

Steel and
Iron Bars

Open Hearth
Steel Sheets

Drop
Forgings

Quality

**THE
STEEL COMPANY
OF
CANADA
LIMITED**

HAMILTON MONTREAL

Service

Railway
Fastenings

Wrought
Pipe

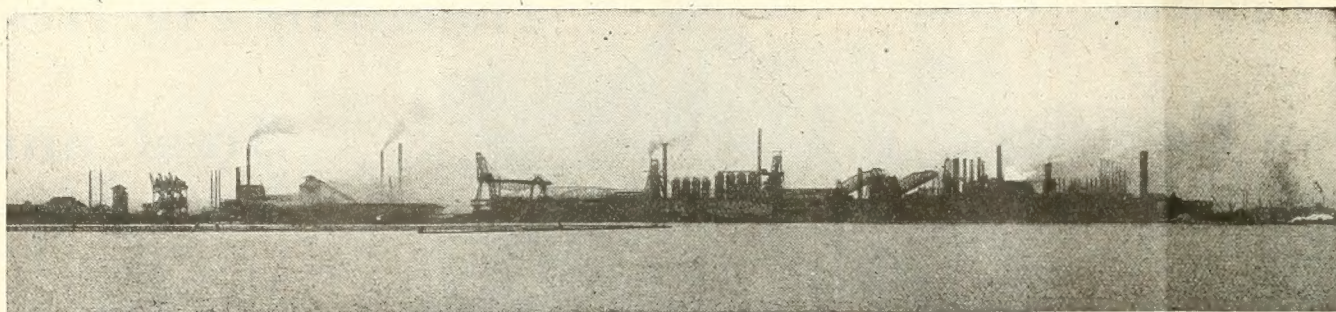
Pole Line
Hardware

Screws & Nails

Bolts Nuts & Washers

Wire & Wire Products

If interested tear out this page and place with letters to be answered.



General View of the Plant of the Algoma Steel Corporation from the Waterfront.

ANNOUNCEMENT



THE ALGOMA STEEL CORPORATION, LIMITED, take pleasure in announcing to their customers and the Canadian trade that in accordance with the widespread desire throughout the Dominion that there should be obtained in Canada with Canadian labor, a much larger proportion of the requirements of this country in STEEL SECTIONS for STRUCTURAL PURPOSES, CAR CONSTRUCTION, SHIPBUILDERS' REQUIREMENTS, etc., they are just completing extensive alterations and additions to their rolling mills, and on or about 1ST NOVEMBER, will be ready to produce and ship American Standard Sections of BEAMS and CHANNELS up to and including 15", all standard sections of ANGLES from 6" x 6" down to 1 1/4" x 1 1/4", ZEE BARS for car builders and general purposes, small and large ROUNDS and SQUARES, and FLAT BARS up to 14" wide. The quality of the product is already well known to the trade, and is exclusively steel made by the Open Hearth process, and can be furnished in all grades from the softest rivet stock to high carbon special spring material.

The following are the sections which will be rolled:---

ANGLES—Equal Leg—

6 x 6"—5 x 5"—4 x 4"
3 1/2 x 3 1/2"—3 x 3"
2 1/2 x 2 1/2"—2 1/4 x 2 1/4"
2 x 2"—1 3/4 x 1 3/4"
1 1/2 x 1 1/2"—1 1/4 x 1 1/4"

ANGLES—Unequal Leg—

6 x 4"—6 x 3 1/2"—5 x 4"
5 x 3 1/2"—5 x 3"—4 1/2 x 3"
4 x 3 1/2"—4 x 3"—3 1/2 x 3"
3 1/2 x 2 1/2"—3 x 2 1/2"—3 x 2"
2 1/2 x 2"

BEAMS—

15", 12", 10", 8", 6", 5", 4", 3".

CHANNELS—

15", 13", 12", 10", 8", 6", 5", 4", 3".

ZEEES—

3 1/4 x 5 x 3 1/4 x 5/16
3 5/16 x 5 1/16 x 3 5/16 x 3/8"
3 3/8 x 5 1/8 x 3 3/8 x 7/16"
3 1/16 x 4 x 3 1/16 x 1/4"

3 3/8 x 4 1/16 x 3 3/8 x 5/16"
3 3/16 x 4 1/8 x 3 3/16 x 3/8"
2 11/16 x 3 x 2 11/16 x 1/4"
2 3/4 x 3 1/16 x 2 3/4 x 5/16"

ROUNDS—

All sizes from 1/2" up to and including 4".

SQUARES—

All sizes from 1/2" up to and including 3".

FLATS—

All sizes from 1 x 1/4" up to and including 14" wide.

MINE RAILS—

All sections from 12 lbs. up to and including 45 lbs. per yard.

PIG IRON—

Machine cast FOUNDRY MALLEABLE and BASIC.

SULPHATE OF AMMONIA.

NITRE CAKE.

For the better convenience of customers who may find it necessary to secure rush shipments of particular items, they contemplate keeping a large stock of all the various standard sections constantly on hand, and to this end extensive warehouse facilities are being prepared.

Your enquiries and business will be appreciated.

ALGOMA STEEL CORPORATION

SAULT STE. MARIE, ONTARIO

WILT

HIGH SPEED AND CARBON TWIST DRILLS

REAMERS AND MILLING CUTTERS

Quality First

The Keystone Upon Which All WILT
Products Are Built

A high standard of perfection is maintained throughout the various processes of manufacturing **WILT High Speed and Carbon Twist Drills, Reamers and Milling Cutters**. WILT products improve production! This is no theory, no untested statement, but an established fact backed by many of the largest manufacturers throughout Canada. For steady, reliable output of work that is satisfactory from the standpoint both of quantity and quality there is no better choice than **WILT Products**.

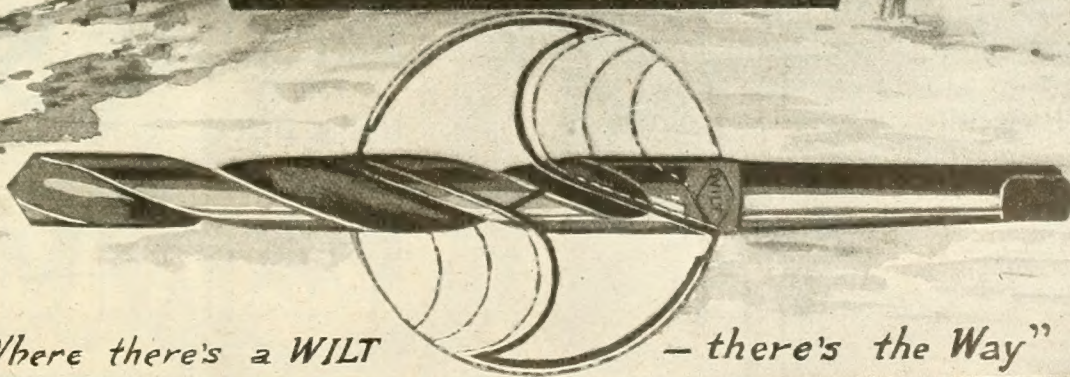
Put Them to the Test

WILT TWIST DRILL COMPANY

OF CANADA, LTD.

WALKERVILLE, ONT.

London Office: Wilt Twist Drill Agency, Moorgate Hall,
Finsbury Pavement, London, E.C. 2, England.



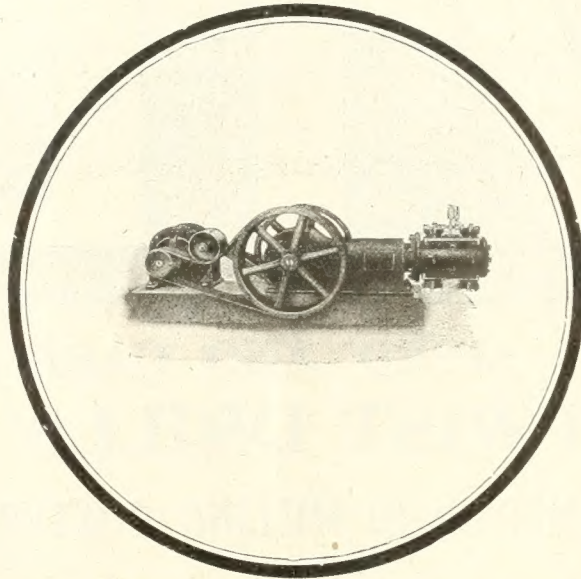
"Where there's a WILT

— there's the Way"

If interested tear out this page and place with letters to be answered.

The Air Compressor for Cramped Quarters

The short-belt drive for air compressors is long past the experimental stage. It is the ideal drive for a compressor installed where space is at a premium. The total floor space occupied by motor and compressor is reduced to a minimum, the belt expense is cut down—running is smooth and quiet. In our own power house we have three two-stage compressors with this drive; we would not have installed them if the short-belt drive were not satisfactory.



All C-I-R-Co compressors are built to carefully determined standards of quality and design. Not only is all material subject to inspection, all shop operations have to secure the O.K. of the chief inspector; finally comes the running test which every compressor undergoes before shipment. The C-I-R-Co has been building air compressors for over twenty years and has a reputation to maintain. Our compressor bulletins will interest you.

CANADIAN INGERSOLL-RAND COMPANY, LIMITED

Sydney

Sherbrooke

Montreal

Toronto

Cobalt

Winnipeg

Nelson

Vancouver

Swedish Steel & Importing Co., Limited

Montreal
New YorkToronto
Denver

Direct representatives
of foremost
Swedish mills:
makers of

Tool Steels

ALLOY STEELS, BILLETS,
BARS, DISCS, SHEETS,
HIGH SPEED STEELS,
DRILL RODS, DRAWN
BARS, SEAMLESS TUB-
ING, COLD ROLLED STRIP
STEEL, WELDING WIRE,
WROUGHT AND ROLLED
IRON, PIG IRON, STEEL
AND IRON ENDS, HOL-
LOW AND SOLID MINING
DRILL STEEL.



PROMPT SHIPMENTS
from large stock

Electrite

Electric furnaces,
automatically
regulated, the
most modern
methods, and the
introduction of
Uranium — make
this a steel of
truly remarkable
cutting proper-
ties.

We know "Elec-
trite" cannot be
bettered — and
stand ready to
prove it to you.

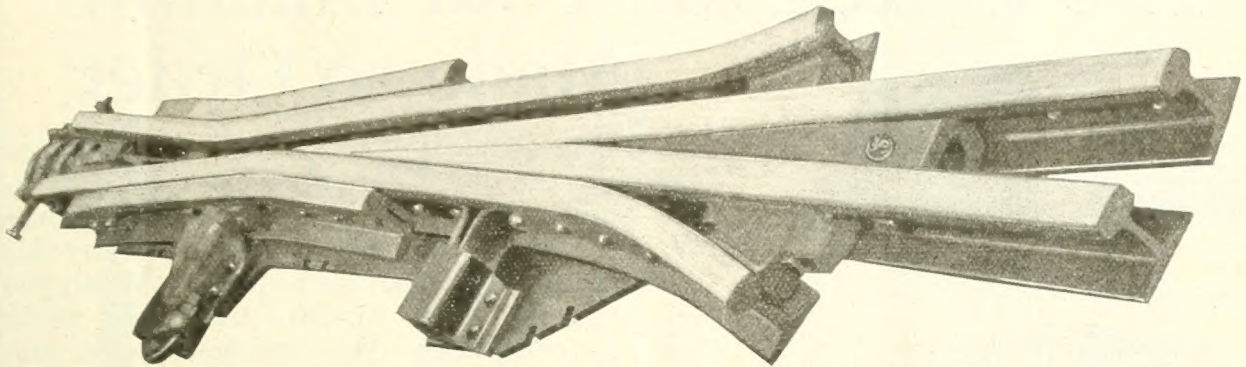
LATROBE
ELECTRIC STEEL CO.
LATROBE, PA.

High Speed Steel

uranium

TRACKWORK

For Steam and Electric Railways



Built-Up Intersections
Frogs Switches

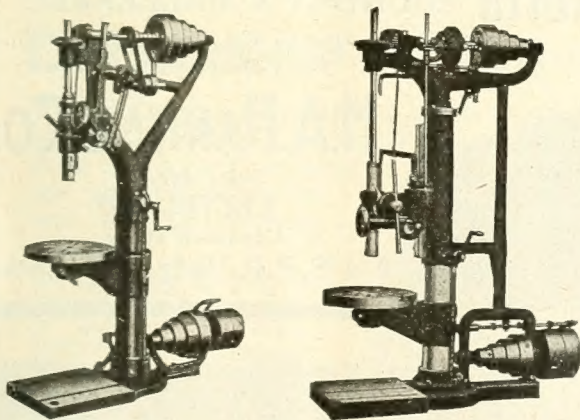
Hard-Centre Intersections
Mates Diamonds

Manganese-Steel Intersections
Crosses Switchstands

CANADIAN STEEL FOUNDRIES LIMITED

Transportation Building, Montreal

SILVER



20- and 25-Inch Drills

Built for speed, accuracy and service.

They represent sixty-five years of specialization, and our intimate knowledge of machine shop requirements. Our 20-inch drills are made in four distinct styles, plain lever feed, lever and wheel feed, power feed and automatic stop and back gearing.

See our booklet for data.

The Silver Mfg. Co., 290 Broadway Salem, Ohio

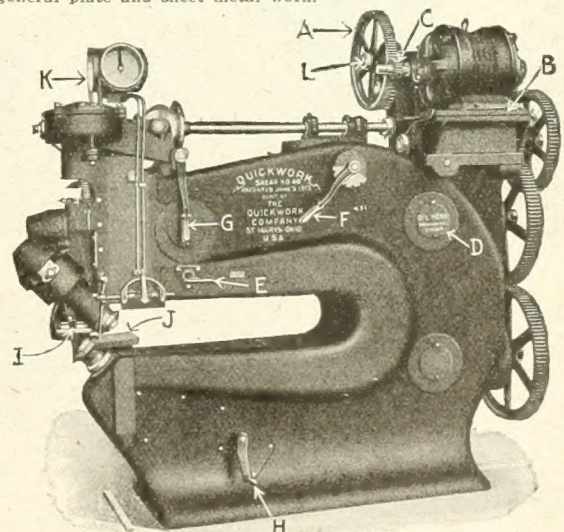
"QUICKWORK"

Registered in U.S. and Foreign Countries.

ROTARY SHEARS

MADE IN 7 SIZES.

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings without cutting in from side of sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.



Patented June 3rd, 1913

SAVES 50% TO 90%

Eliminates Oxyacetylene Cutting and Plate Planing.
Write for Catalogue No. 60.

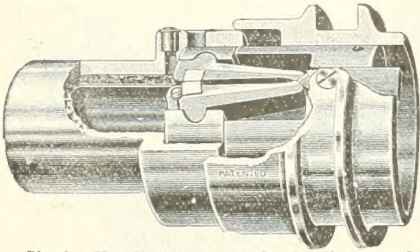
THE QUICKWORK COMPANY, ST. MARYS, OHIO, U.S.A.

Cable address: "QUICKWORK."
Codes: W. U. and General.

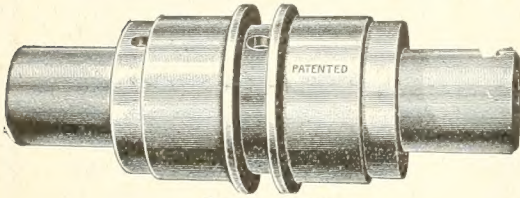
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THE JOHNSON FRICTION CLUTCH

The Clutch for Your Machine Made to Order



Single Clutch—Interior—Clutch Disengaged.



Double Clutch.

Where space is limited and conditions are exacting, the clutch problem presents difficulties—unless you know about Johnson clutches. We offer you an efficient clutch made in any size or form that your machine requires. When you are designing a new machine, it will be worth while to consult us. Our facilities are at your disposal without any obligation to you.

THE JOHNSON FRICTION CLUTCH

THE CLUTCH OF A THOUSAND USES

WRITE TO-DAY FOR OUR YELLOW DATA SHEETS

Canadian Agents:

WILLIAMS & WILSON, LIMITED, 84 Inspector Street, Montreal
CANADIAN FAIRBANKS-MORSE CO., LIMITED, Montreal, Toronto and Winnipeg

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Coal
Coke
Iron Ore

Pig Iron

Victoria FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada

M.A. HANNA & Co.

Sales Agents:
CLEVELAND

Canadian Office:
904 C.P.R. Bldg., Toronto

FIRTH'S

Speedicut ^{HIGH}SPEED Steel

Insures Maximum Production

FIRTH'S CARBON TOOL STEELS
Standard Brands Highest Quality

THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES | 449 St. Paul St. West, MONTREAL
79 West Adelaide St., TORONTO

J. A. SHERWOOD
Canadian Manager

Every Emery Wheel With Its Own Dresser



Desirable, isn't it, now that cost is no objection? For with an inexpensive Desmond-Stephan Dresser for every wheel, every wheel will be touched up frequently and so kept true and equal to its original cutting efficiency.

For all ordinary shop grinding wheels specify "Diamo-Carbo"—the perfect diamond substitute.

For large, coarse, hard wheels ask for the "Desmond-Huntingdon."

Sherman Corrugated, 2 sizes
Norton Zig-Zag, 2 sizes
Magazine
Diamonds

The Desmond-Stephan complete line of Economical Grinding Wheel Dressers is catalogued. Write for copy.

The Canadian Desmond-Stephan Mfg. Company
HAMILTON, ONTARIO

Alfred Herbert, Limited, Coventry, Agent for Great Britain

Harris Heavy Pressure

The Babbitt Metal that's at the Front in Efficiency and Economy



Order a Box from our nearest Factory

Our Guarantee is Back of Every Pound of Babbitt Metal We Make

Manufactured by

The Canada Metal Company, Limited

TORONTO
HAMILTON
MONTREAL

CANADA
WINNIPEG
VANCOUVER

STEEL for Every Commercial Purpose

We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.

Nova Scotia Steel and Coal Co., Limited

Head Offices:
New Glasgow, N.S.

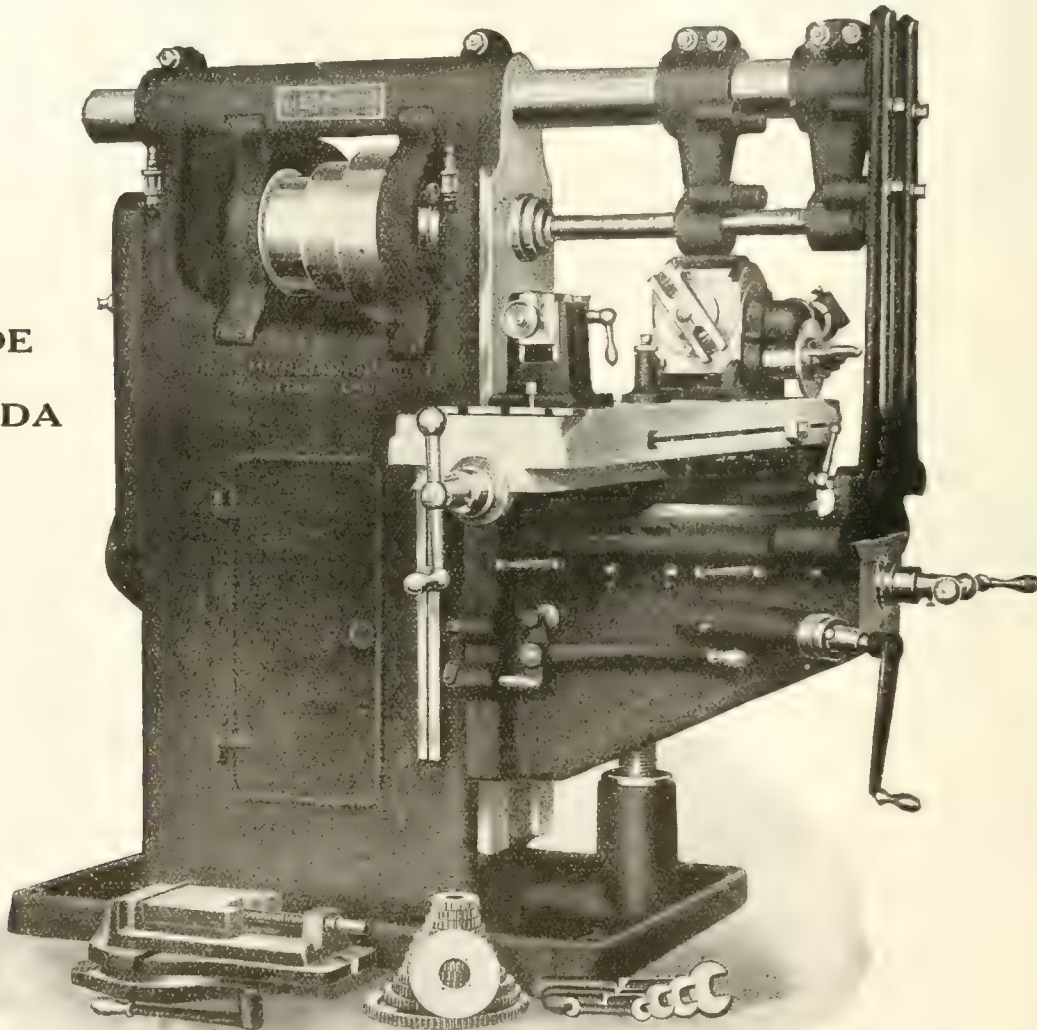
Western Sales Offices:
Room 14 Windsor Hotel
MONTREAL



Steel Ingots
by the
HARMET
Liquid Process

FORD-SMITH MILLING MACHINES

MADE
IN
CANADA



No. 3 Universal Miller

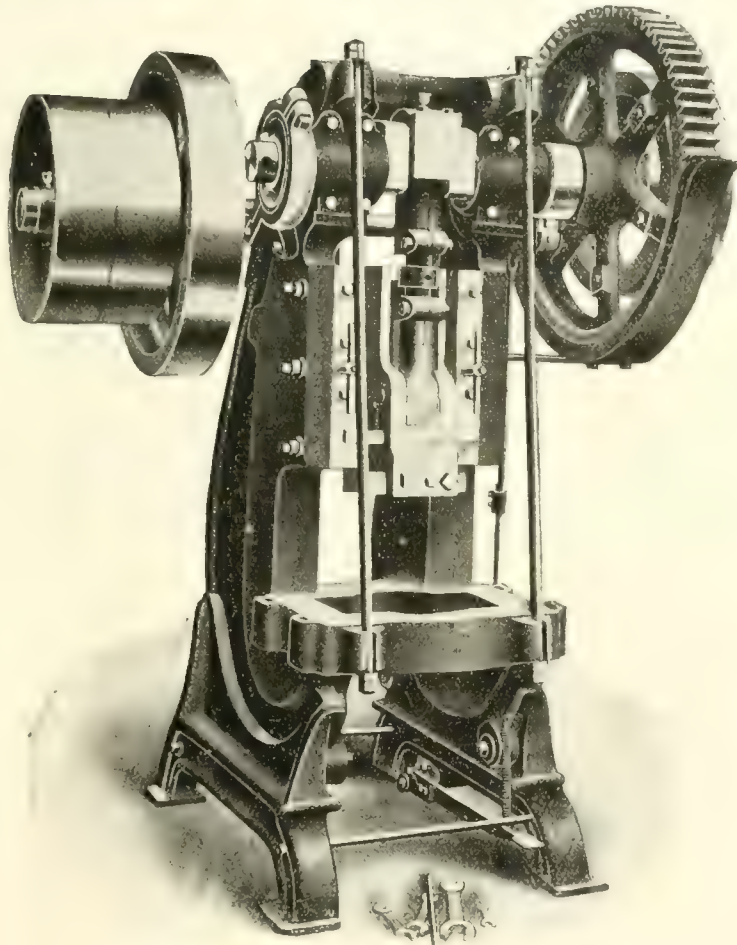
By their continuous and accurate performance under the strenuous wartime conditions, FORD-SMITH MILLERS have added a distinctive page to their reputation.

MANUFACTURED BY

THE FORD-SMITH MACHINE COMPANY, LIMITED,
HAMILTON, CANADA

Foreign Agents: W. E. Storey, 3 Arundel St., London, Eng.
Gollin & Co., Melbourne, Australia

For Your Pressing Needs



No. 215 Inclinable Geared Press

Quality that is **"Built In"** stands out on all B.B. Power Presses.

The long slides insure accurate work and long life to your dies. The steel pitman screw gives added strength at a vital point.

The Crankshafts are made from high carbon steel forgings and are **"Heat Treated"** so as to give the maximum shock-resisting qualities and prevent crystallization. This is a feature no other press manufacturer can claim.

Let us quote on your next presses. The machines are the best that can be produced and our prices are low in comparison with the value you will get.

The Brown Boggs Co., Limited

Hamilton, Canada

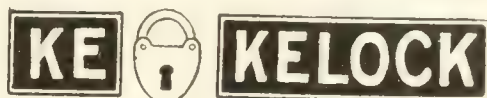
Manufacturers of Presses, Shears, Rolls, etc., also Tinsmiths' Tools and Sheet Metal Working Machinery of every description.

BRITAIN'S BEST

KE

BRANDS OF ALLOY & TOOL STEELS

In Billets, Bars, Sheets, Hot and
Cold Rolled Strips, Cold Drawn
Cast Steel, Wire and Drill Rods
HIGH GRADE STEEL FOR ALL PURPOSES



Our Principal Trade Marks

KAYSER ELLISON & CO LTD

ESTABLISHED 1825
Complete Stock

SHEFFIELD, ENG.
Montreal Warehouse

RALPH B NORTON

Agent

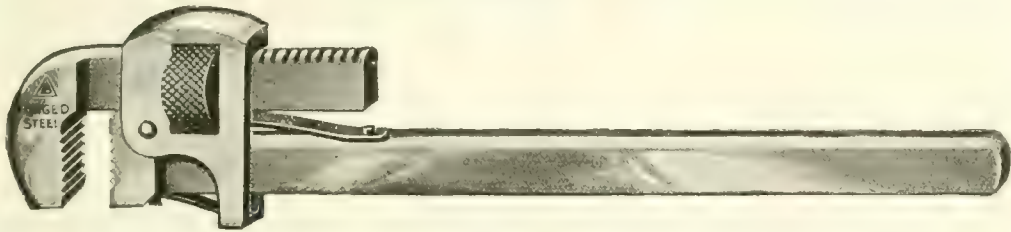
126 Craig St. West

Montreal, Que.

CANADA FOUNDRIES & FORGINGS LIMITED

ENDURANCE TOOLS

NEVER WEAR OUT



PIPE THE WRENCH—WRENCH THE PIPE

Canadian Billings & Spencer Plant
Welland, Ont.

LOCOMOTIVE AND CAR WHEEL TYRES

HIGH-SPEED AND CARBON TOOL STEEL

MISCELLANEOUS SHOP TOOLS

MADE IN CANADA

ARMSTRONG WHITWORTH OF CANADA, LIMITED

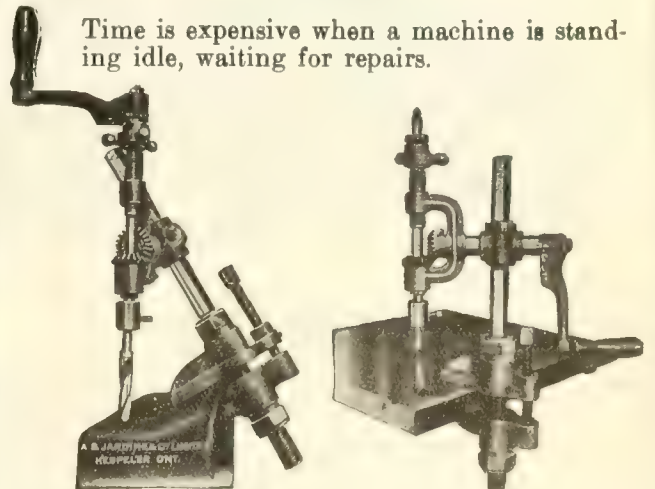
Head Office :
298-300 St. James Street,
Montreal

Works :
Longueuil, Que.

Branches :
126 Wellington St. W. TORONTO 27 King William St. HAMILTON McArthur Building WINNIPEG

Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.



On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, \$26.50 net
Sold by all Machinery and Supply
Houses

A. B. JARDINE & CO., Limited
HESPELER, ONTARIO

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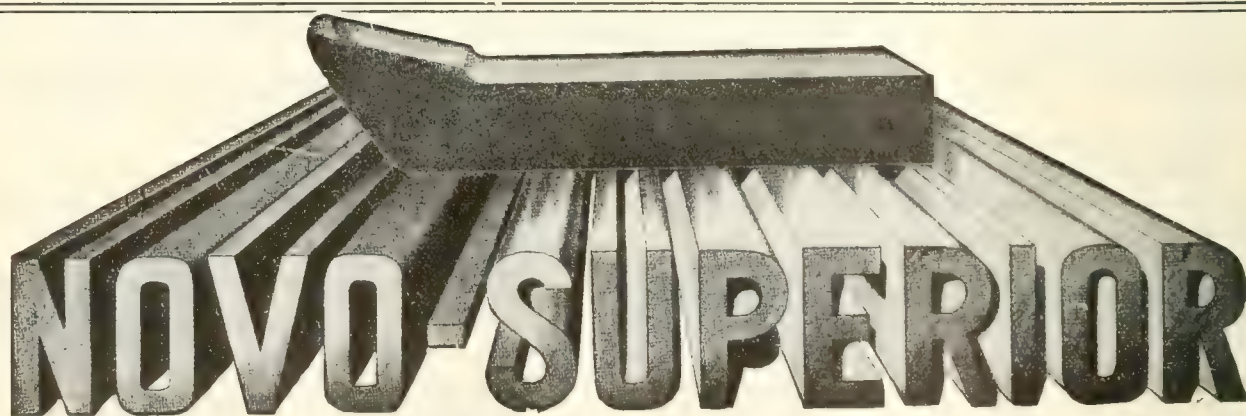
"WACO"

THE HIGH SPEED STEEL

MARSHALL, SON & BUNNEY
39 Richmond Street East TORONTO, ONT.

SOLE CANADIAN AGENTS FOR
WM. ATKINS & CO., LIMITED
SHEFFIELD - - ENGLAND

ALL SIZES
IN STOCK



HIGH SPEED STEEL

INTRA STEEL

GIBRALTAR STEEL

Tool Steel for Every Purpose

SWEDISH LANCASHIRE IRON.

Twist Drills, Taps, Hack Saw Blades, Milling Cutters, Files, Etc.

Music Wire for Springs, Steel Balls

Cold Rolled Tool Steel in Strips and Sheets.

We call to your particular attention that we make a specialty of
and solicit your inquiries for

Circular Saws—for wood and for hot or cold metal cutting

Machine Knives—for cutting wood, paper, tobacco, agricultural.

PILOT STEEL & TOOL COMPANY, Limited, 322 St. James St., MONTREAL

Sole Agents for

JONAS & COLVER, LIMITED

H. BOKER & CO., Inc.

Novo and Continental Steel Works, Sheffield, Eng

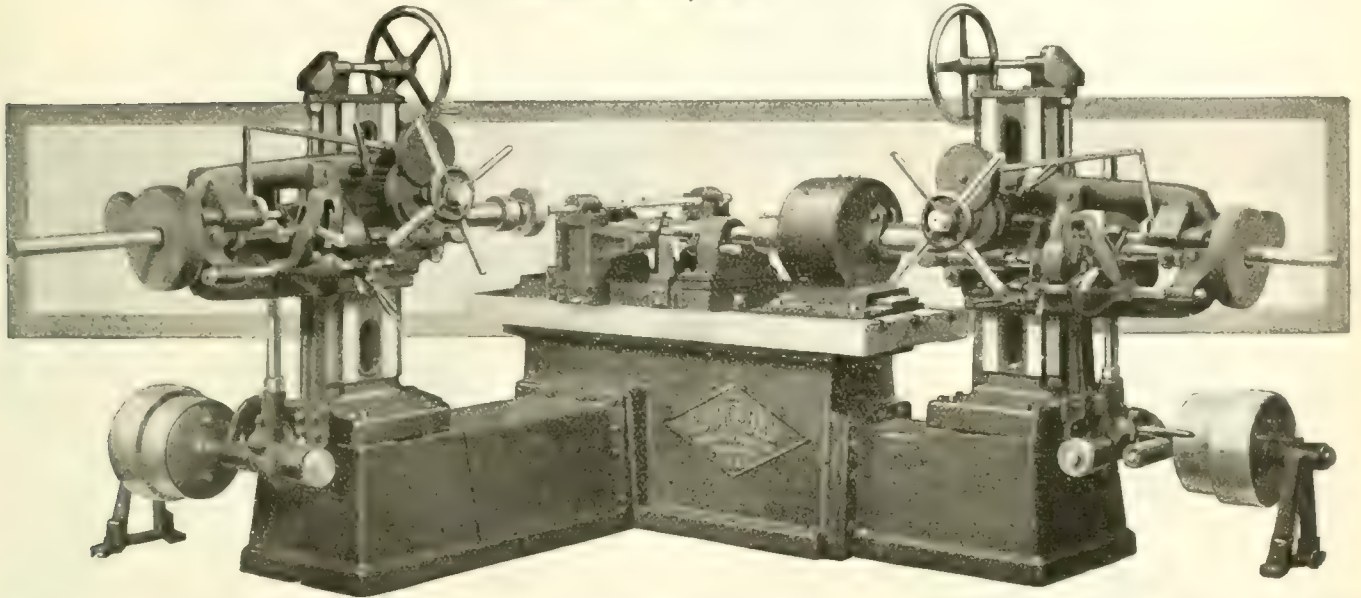
New York, N.Y.

Rockford Horizontal Boring Machine

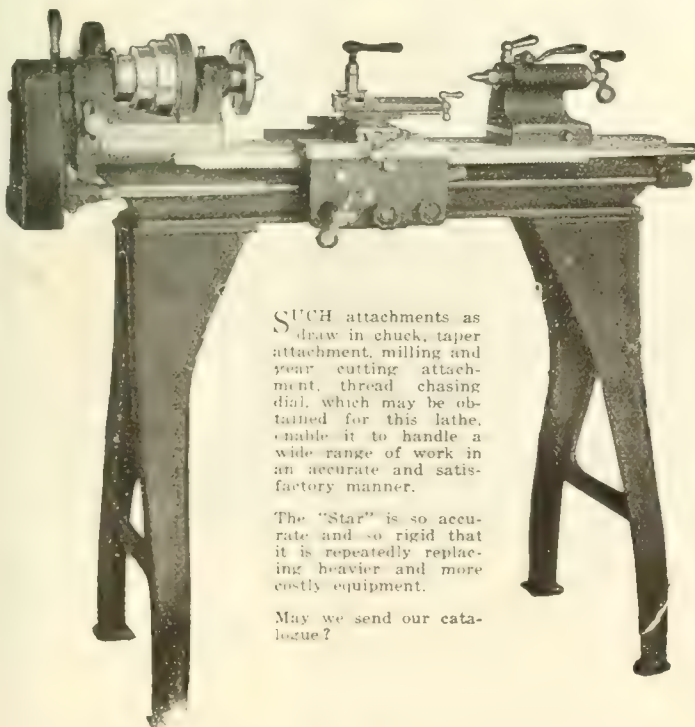
**For
Automobile
Manufacture**

This tool is unusually rapid and accurate in the boring of crank cases, transmission cases and rear axles. Has two heads at right angles to each other. Spindles bore longitudinal and cross holes in work simultaneously.

Send us blue prints of your boring work and we will give you figures on the "Rockford's" ability on it.



The Rockford Drilling Machine Co., Rockford, Ill.



SUCH attachments as draw in chuck, taper attachment, milling and gear cutting attachment, thread chasing dial, which may be obtained for this lathe, enable it to handle a wide range of work in an accurate and satisfactory manner.

The "Star" is so accurate and so rigid that it is repeatedly replacing heavier and more costly equipment.

May we send our catalogue?

9" x 4'

"Star" Lathe

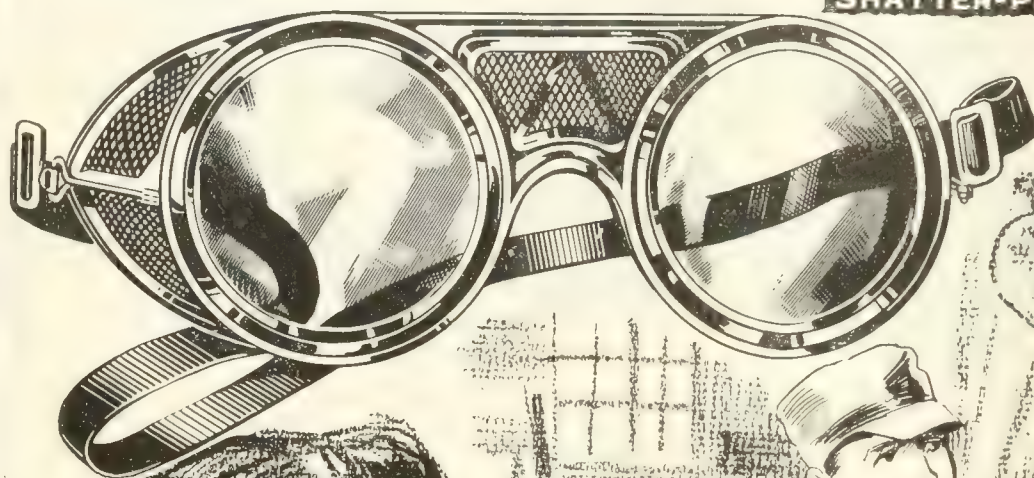
A tool particularly well adapted for model work, experimental laboratory and fine scientific work as well as for the individual in his own shop.



The Seneca Falls Mfg. Company, Inc.
366 W. Fall St., SENECA FALLS, N.Y.

Mr. Safety Engineer, don't wait for an eye accident before ordering **STOCO** SAFETY GOGGLES "CELOGLAS"

SHATTER-PROOF LENS



The proverb anent a stitch in time—not to mention the one about an ounce of prevention—is very applicable to the prevention of eye accidents. The protection afforded by **Stoco** Safety Goggles is fast becoming proverbial in industrial fields.

PRICE

(With either easy cable earbows or black elastic headband)	Per 100
With Clear Glass Lenses	\$115.00
With Celoglas "Shatter-Proof" Lenses	\$150.00

A sample of the **Stoco** Safety Goggle will be sent without charge to Safety Engineers, Purchasing Agents and Superintendents on receipt of request on letterhead.

STANDARD OPTICAL Co.
GENEVA, N. Y.

Quality and Quantity Production

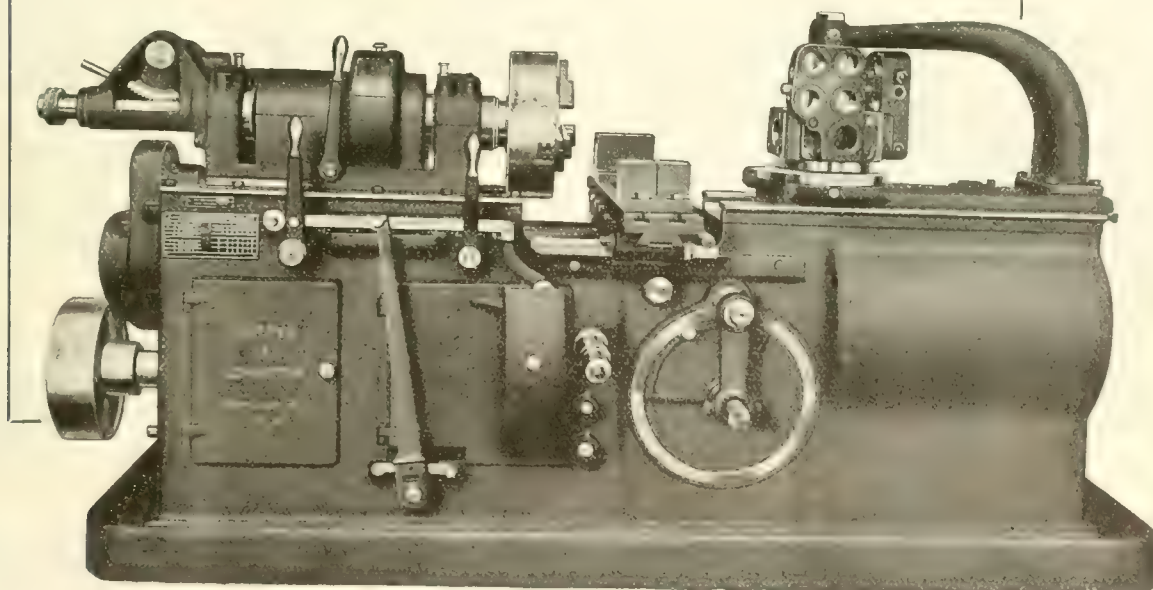
This piece is a cast iron front end plate, and was finished on the Potter & Johnston Manufacturing Chucking and Turning Machines in two chucking operations.

On a job of this nature one man can easily attend to anywhere up to six machines, and all he has to do is to put work in the chuck and take it out again when the machine has finished it.

Nothing could be simpler.

Why don't you send samples or blue prints, then we can tell you what P. & J. Automatics can do on your work?

Bulletin 41



Canadian Offices: POTTER & JOHNSTON MACHINE CO.

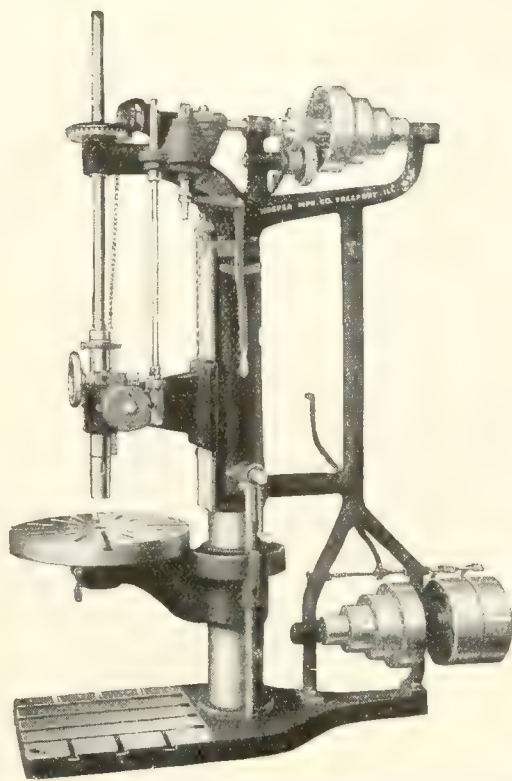
ROELOFSON MACHINE & TOOL CO., LIMITED

*Head Office: 1501 Royal Bank Building Toronto, Canada
Works and Warehouse: Galt, Ontario, Canada*

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The Driller for Exact Work

HOEFER



Enable Your Workmen to Eliminate Spoilage

The Hoefer Driller is pre-eminently the one to be found in the best plants. "It's almost as good as a Hoefer," so often heard in the machine and tool trade, indicates the position held by Hoefer Drillers.

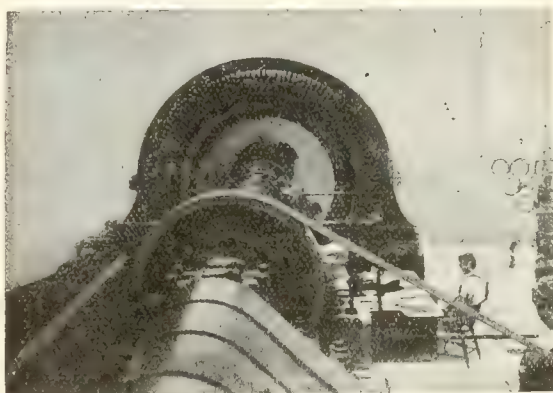
Exact drilling, to the last thousandth of an inch, pays by eliminating spoiled material. Hoefer Drillers pay for themselves and increase the workman's pride in his work.

Twenty-five Years on Market

Twenty-five years making drillers has given Hoefer the "Know-how." The Hoefer Drillers are used by many of America's leading manufacturers. Equip your factory the Hoefer way. Take any kind of a drilling problem you have to the Hoefer Manufacturing Company, and the Company's experts can tell you how it was solved by other men, some of whom you may know.

Investigate now. Write to-day for catalog. The Hoefer engineers are at your service.

HOEFER MFG. CO.
FREEPORT, ILL.



5000 H.P. Morse chain (4 strands) operating generator from water wheel.

"Renold" or "Morse"

Silent Chains

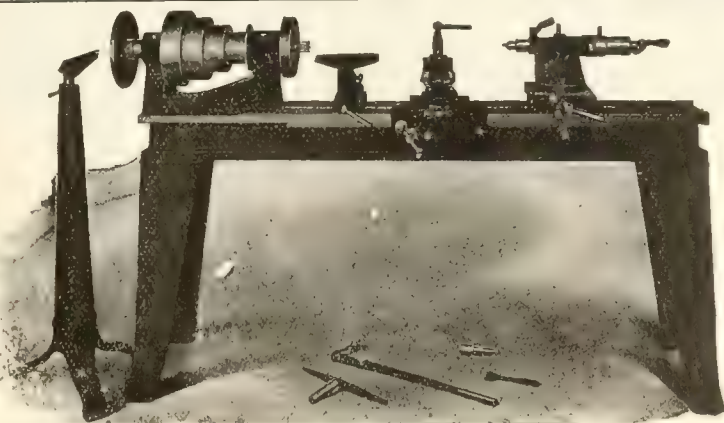
are employed throughout Canada on Main Drives, Municipal Fire Pumps, etc., Evidencing Absolute Reliability.

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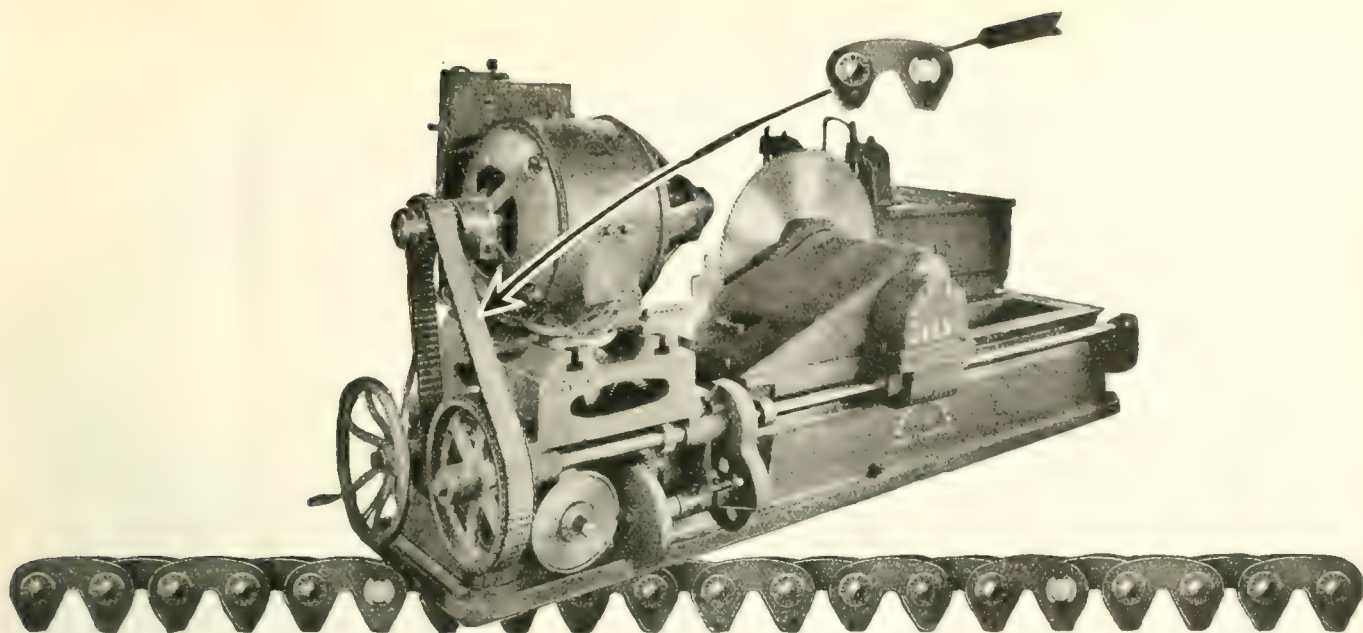
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FAST AND ACCURATE—Equipped with set over swivel tailstock and carriage, and outside face plate and tripod. Built in 16" swing with beds 6 or 8 feet in length. Spindle is made of high carbon steel, is hollow and fitted with Morse Taper and runs on self-oiling bronze bearings.

Our catalog gives a full description of this strong and highly efficient machine, also our other quality speed lathes and grinders. Give us your address.

J. G. BLOUNT COMPANY
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98.2% Efficient On Actual Test

This is what an actual test proved the efficiency of Link-Belt Silent Chain Drives

IT is one of the reasons why the Machine Tool Builders of this country are making it a standard means of transmitting power, and maintaining a higher standard of efficiency. Link-Belt Silent Chain Drives combine the flexibility of the leather belt with the positive action of cut gearing, eliminating the disadvantages of both and maintaining a

higher efficiency than either. You need this drive for your new machine tool, for line shafting throughout your factory or any place where you must transmit power without slip or loss. Write for Data Book No. 125.

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WELLINGTON AND PETER STS., TORONTO, ONT.

LINK-BELT SILENT CHAIN DRIVES

We Also Make

- ☐ Elevators and Conveyors
- ☐ Link-Belt and Sprockets
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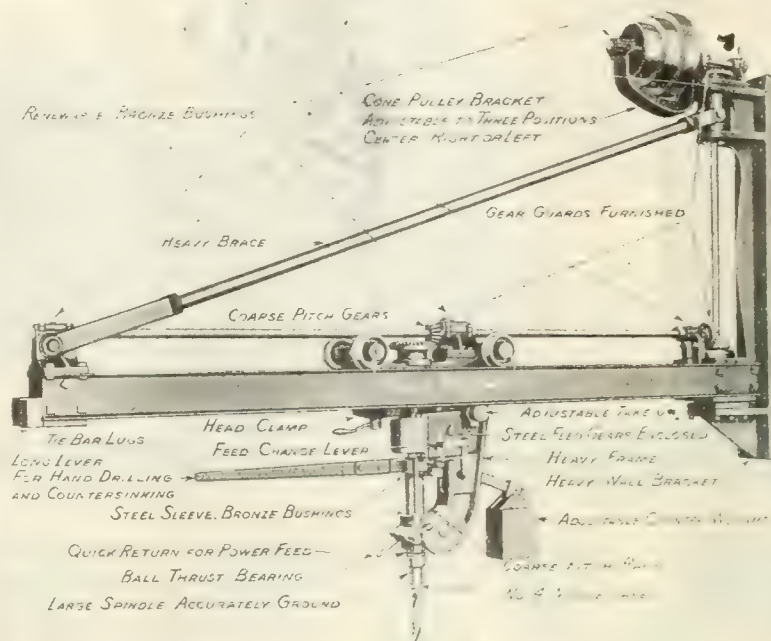
You can't do better than install this Wall Radial Drill in your plant. We'll say you won't have it in operation more than a month before you will begin to congratulate yourself on your judgment in adding this machine to your equipment. Materials and workmanship that you can depend upon to the limit are features of the construction, and our bulletin will give full details.

GET IT TO-DAY!

MADE IN FOUR STANDARD SIZES.

Rated size	Drills to centre of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

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Built for Service

The Canadian Radial Drill is designed particularly for work in structural shops. For seaming and countersinking large surfaces such as structural shapes, boiler plates, long beams, etc.

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Spindle $2 \frac{3}{16}$ " diameter No. 2 or 3 Morse Taper Spindle travel $8 \frac{1}{2}$ ".

All gears accurately cut and fitted.

Carriage wheels equipped with roller bearings.

14" x 14" tight and loose pulleys or single pulley for belt drive to motor, or direct connected to motor.

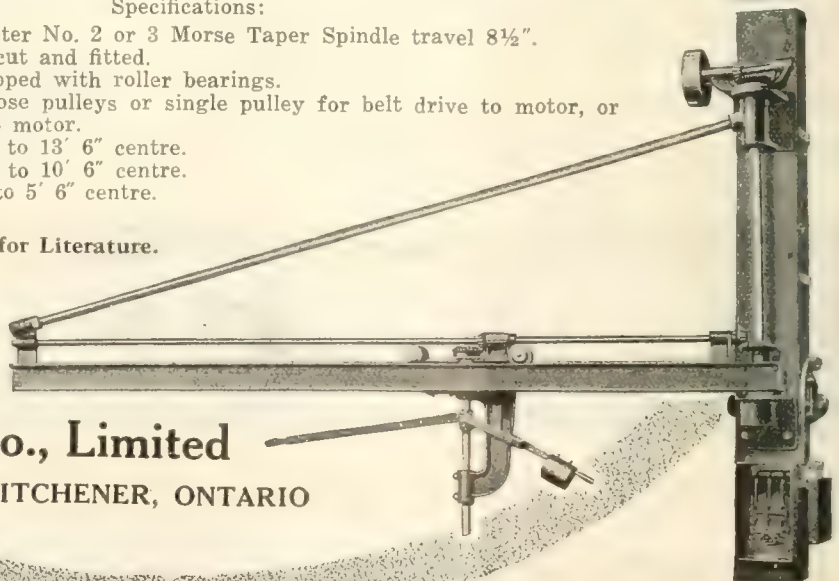
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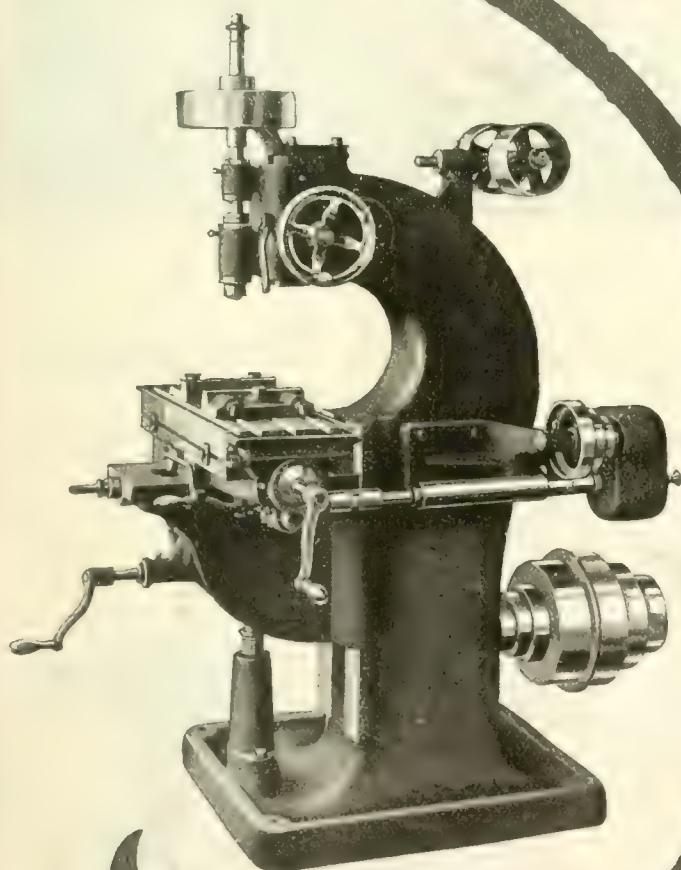


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ALL-ROUND machines for high grade work, they are equipped with special labor-saving attachments that add to their convenience and enable the operator to "speed up" without endangering accuracy.

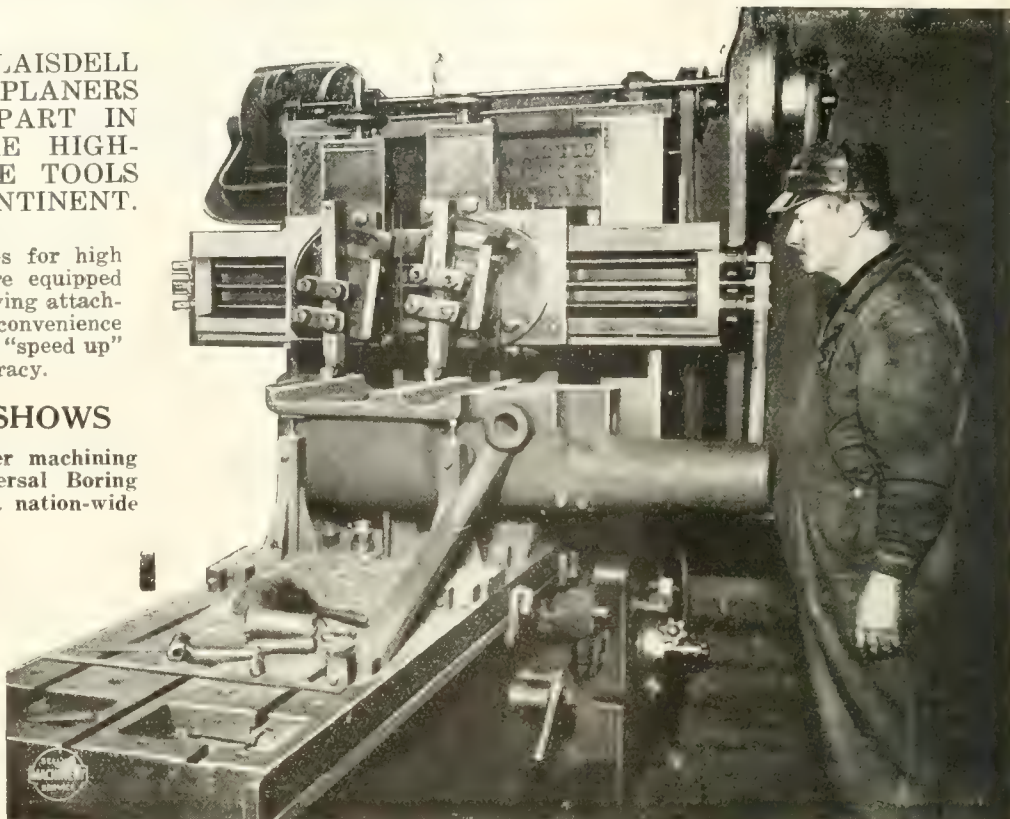
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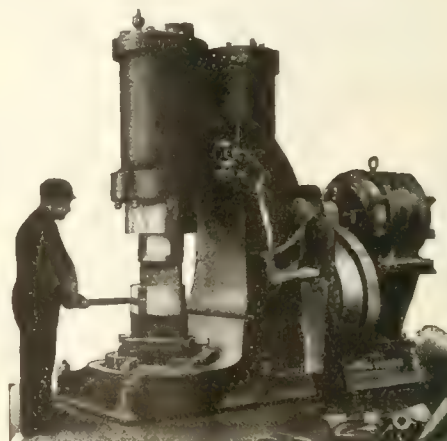
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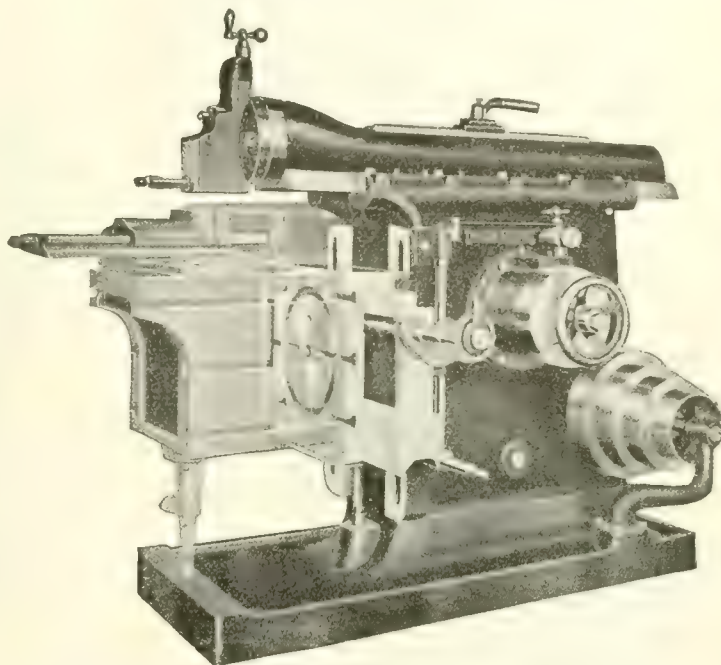
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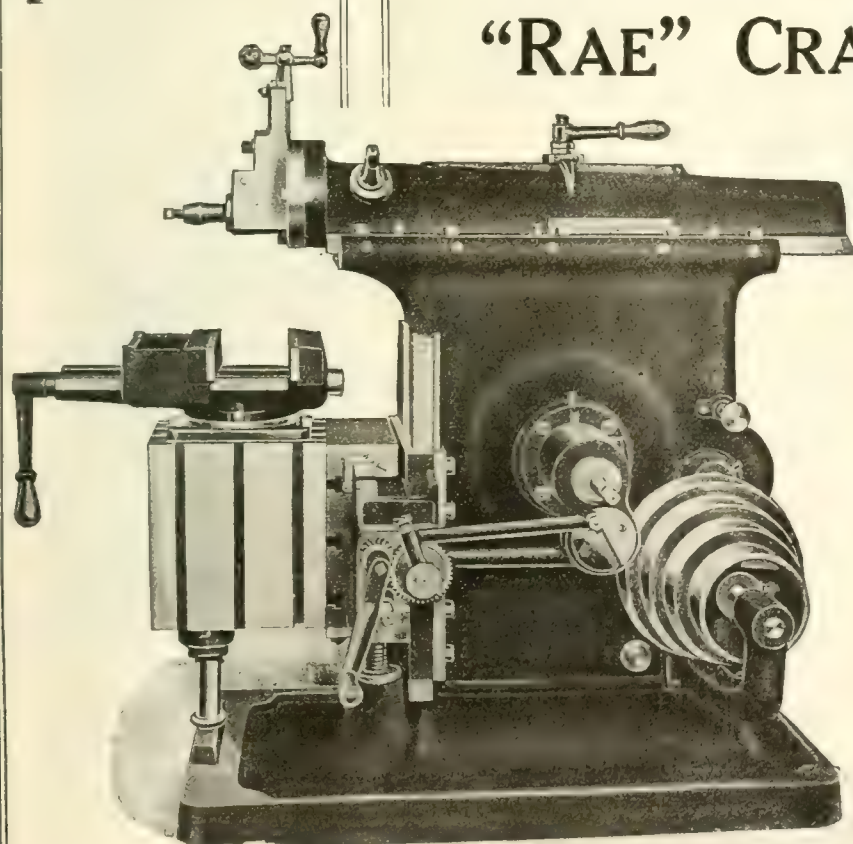
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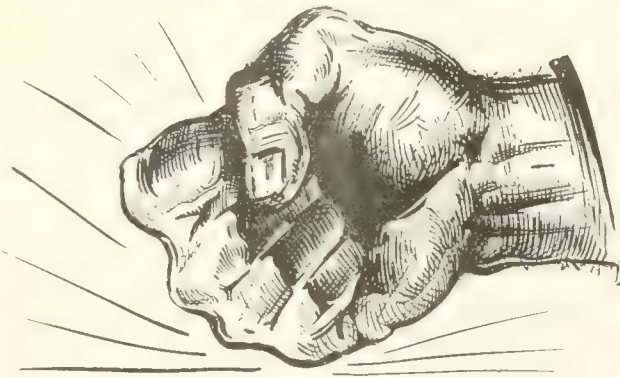
*Where Accuracy is
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THE design of Rae shapers embodies every necessary essential for obtaining maximum production with accuracy on all work.

The column is ribbed internally, providing absolute rigidity. The ram is also constructed to withstand heavy duty and can be adjusted to any position while machine is in motion.

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With the "RACINE" use H.S. Tungsten Power Blades.

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Use "RACINE" H.S. Tungsten Blades

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Will prove an economical investment and should be used in every machine shop.



If you care
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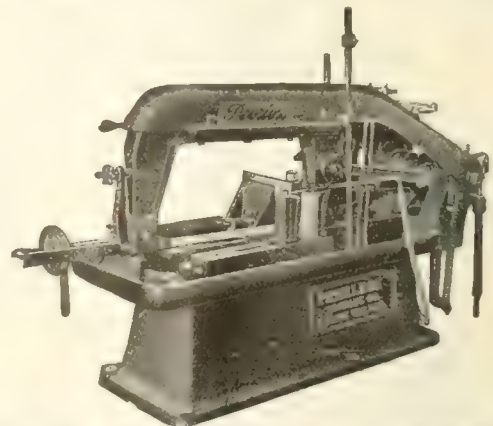
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Machines do 50 to 100% more work



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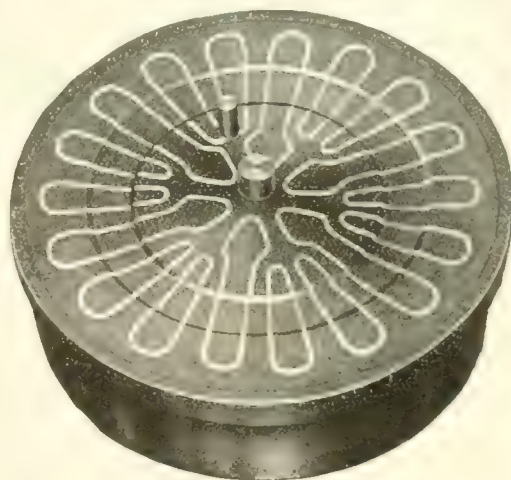
Heald says "*Magnetically*"



A most unique application of a Heald chuck was recently tried out on a lathe for holding a fabroil gear, to be turned inside and outside. The gear was centered by a plug in the chuck. Another pin, which entered a hole in the web, took the thrust of the tool and helped drive the work. The top plate of the chuck was grooved to fit the flanges of the gear.

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The chucking time was reduced 20% and it proved so successful that eight chucks were ordered on its merits.



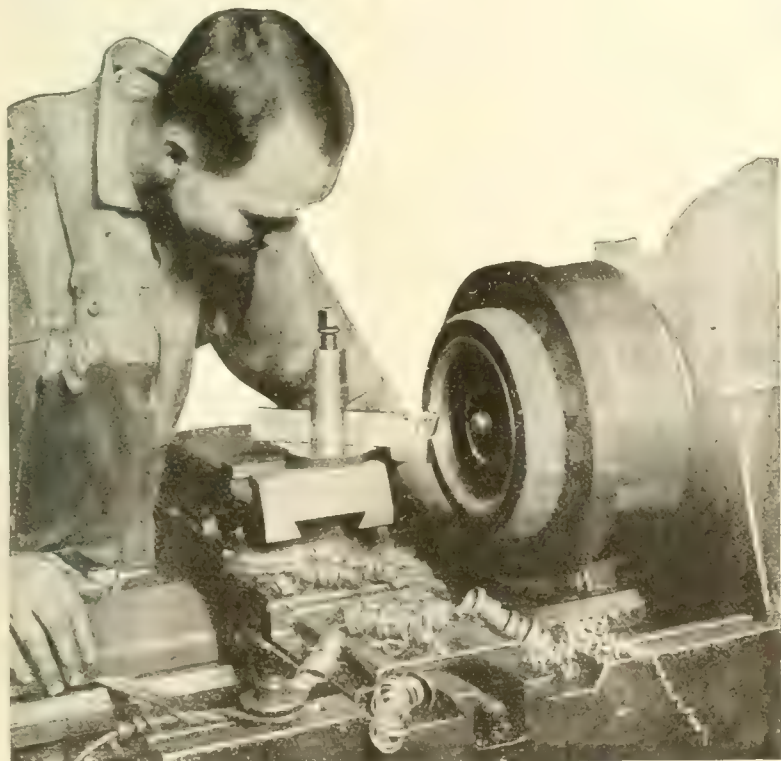
Chuck as arranged with centering plug and driving pin

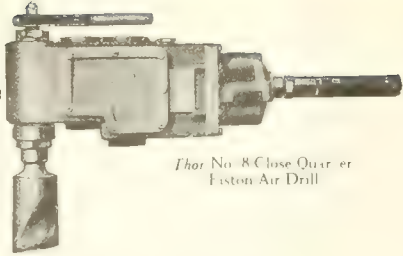
Not every lathe job can be handled with a magnetic chuck, but a large majority can, especially where it is not necessary to take an extremely heavy cut.

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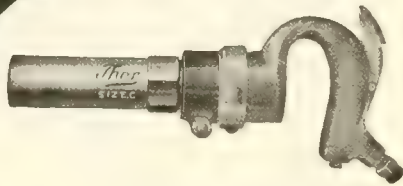




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Fasten Air Drill

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and you will find
EFFICIENCY

Thor



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Calking Hammer



Thor Light Chipping
Hammer

The name "Thor" on a pneumatic tool is an assurance of long life and wonderful efficiency.

The Thor line comprises Hammers for Chipping, Beading, Calking, and Riveting; Drills for wood or steel; Portable Grinders; Holder-Ons, etc.

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If there is such a thing in the world as a walking storehouse of gage-information the Johansson man covering your territory is it.

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Nobody has to be on his guard against "salesmanship" when he sees a Johansson representative.

With our men it is *gage service* first and last—with *gage sales* only when everybody is willing.

So, next time the Johansson man sends in his card, see him, let him go through the "works" with you. He might see some-

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Remember—it is well to be acquainted with anyone who can be of service.

Mailing this coupon will signify your willingness to become acquainted.

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C. E. Johansson, Inc.,
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I will meet your man first time he is in our vicinity

Name

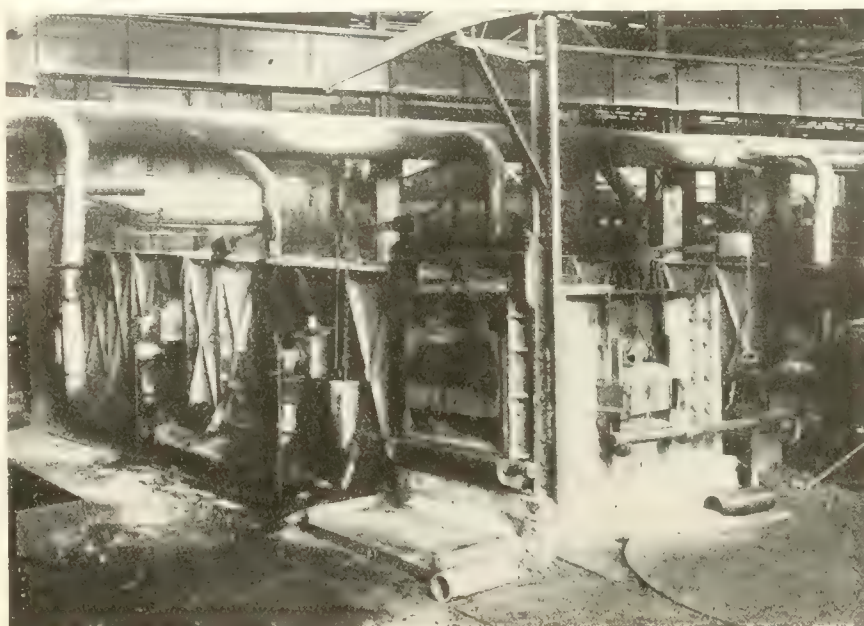
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demonstrated its superior features point by point to a group of men whose years of experience in the heat-treatment of metals made them appreciative



judges. We refer to the "Mecol" Furnace shown in this illustration, installed at the Pointe St. Charles Works of the Canadian Steel Foundries, Limited.

Our intimate knowledge of heat-treating methods, and our long experience in the building of efficient furnaces fit us to give helpful advice—and that we will do promptly if you

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Mechanical Engineering

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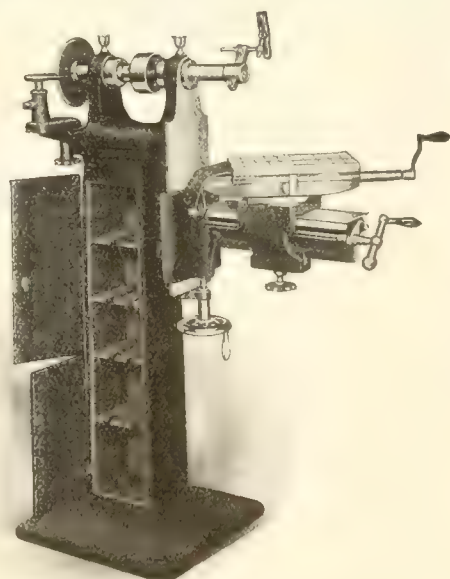
OBTAIN THE BEST RESULTS

From Cutters and Tools Kept Sharp on
**GARVIN No. 3 UNIVERSAL
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Simple

Light Running

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GARVIN No. 3, Universal Cutter
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Use Code—Banish

The spindle is hardened and ground and supported out close to the wheel by an extended bearing, and carefully protected from emery.

The knee and the yoke carried on the knee both have a large range of adjustment. On the knee yoke or carriage is mounted the swiveling table, which has a quick, sensitive movement by rack and pinion operated from end or side.

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Machine is designed to keep its original factory accuracy.

CAPACITY: CUTTERS, 14" x 6"; SURFACES, 9½" x 6"

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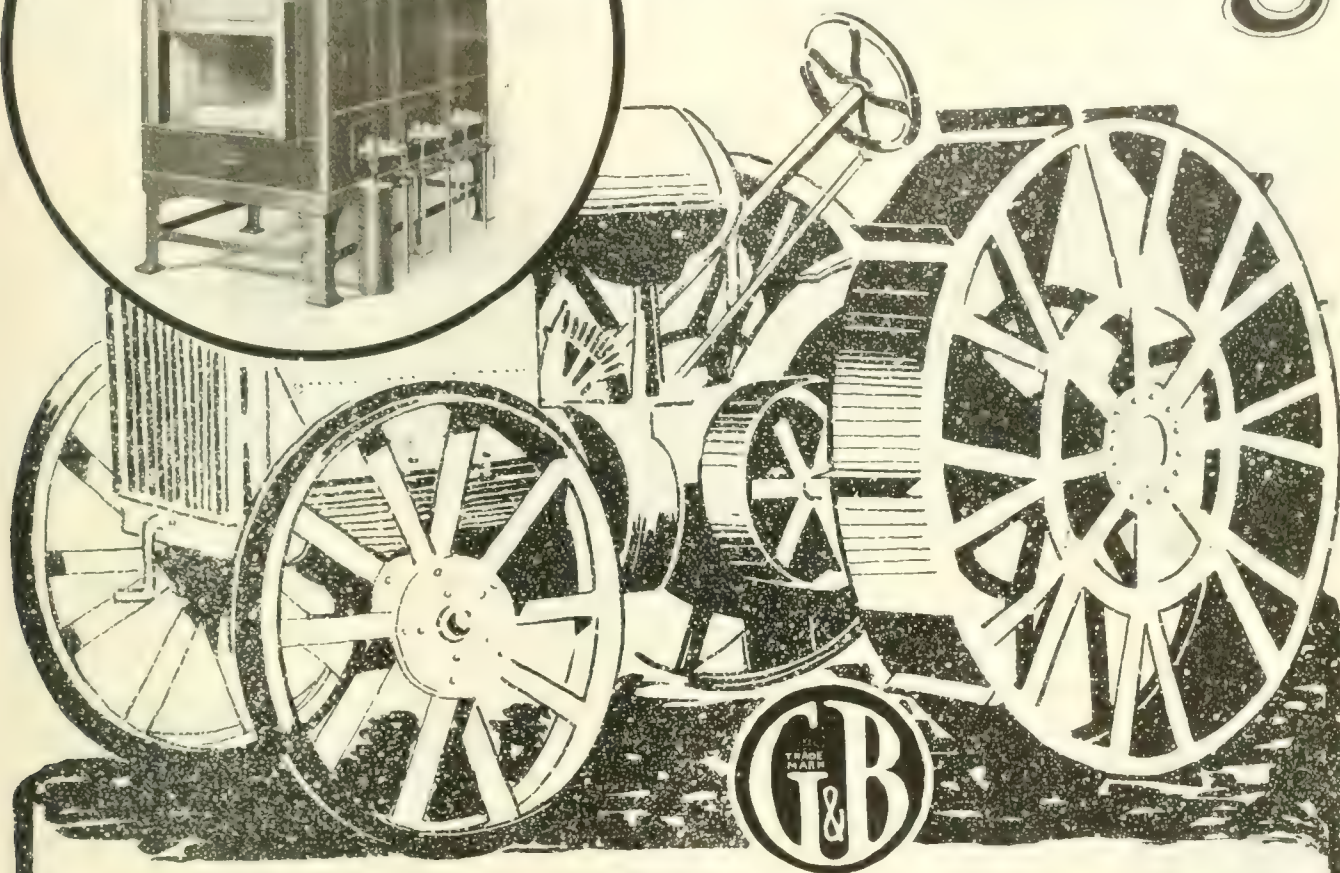
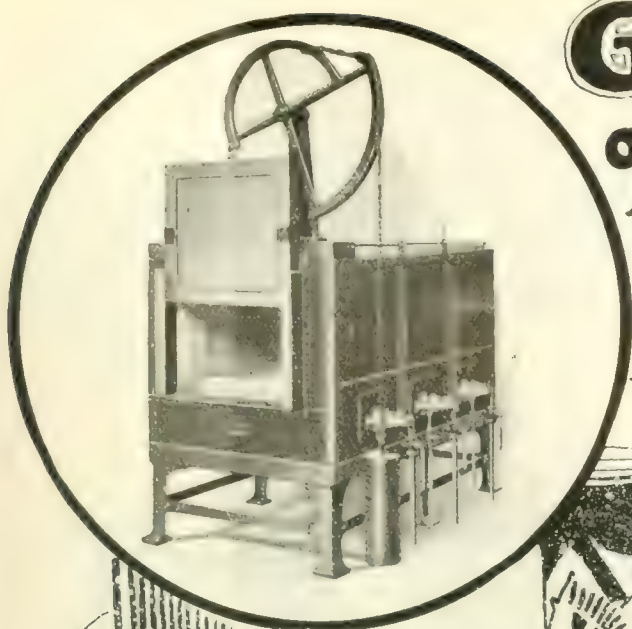
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Spring and Varick Streets

Manufactured by
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Gilbert & Barker Method the Right Method of Heat-Treating

Used by the Largest Manufacturers of Autos and Trucks.

Whether you manufacture tractors—automobiles—trucks—crankshafts—camshafts—tools—machine parts or anything else that requires heat-treating unless you have the **right** kind of heat-treating furnace for the purpose, you are defeating your own purpose, that of turning out a first-class product of uniform high quality.

**GILBERT & BARKER FURNACES INSURE
PERFECT COMBUSTION—ABSOLUTE TEMPERATURE CONTROL
UNIFORMITY OF HEAT**

the result of which is an exceptionally high grade product which measures up to the best manufacturing standards. There is a G. & B. Furnace exactly suited to your requirements. Let our engineers advise you—write. To-day is a better day than to-morrow to send for Bulletin 24.

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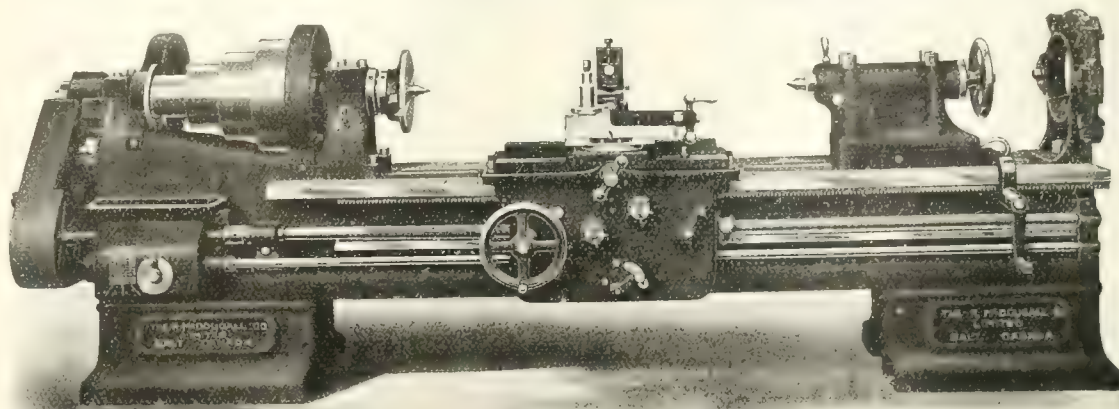
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And every feature is proof of our aim to produce a machine of unusual merit.



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Durably Made Steel Letters and Figures

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MATTHEWS Steel Letters and Figures are hand-made from high quality Pittsburgh steel, properly tempered to assure hardness. They give long service under hard conditions.

Matthews line of steel stamps includes a wide range of letters, figures and symbols—for concave, convex or flat surfaces.

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We searched the continent until we found the best file steel procurable—Clay Crucible Cast Steel.

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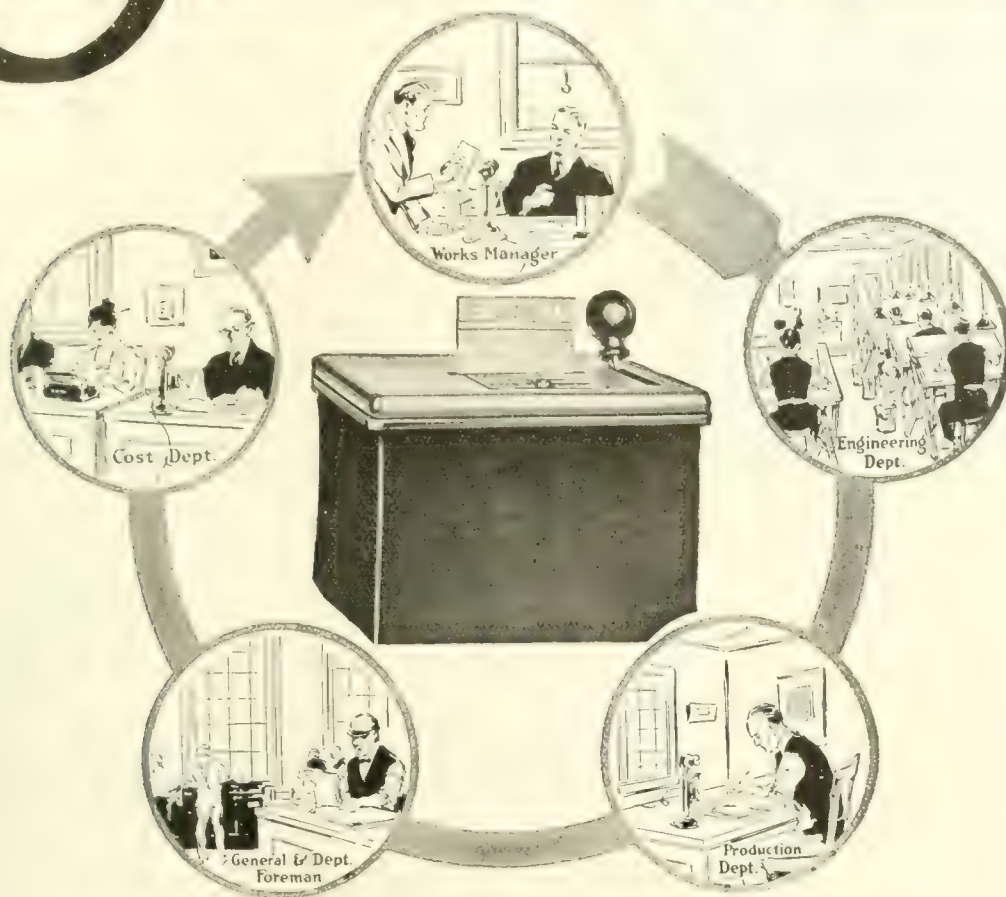
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Efficient Factory Control Is Built Around the Periodograph

All departments benefit from the time the order comes to the works manager.

Periodograph time tickets help plan and route the work, report the correct time on each operation and give the facts from which accurate costs may be figured.

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GISHOLT MACHINE CO., 1153 East Washington Ave.
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Builders of Standard and Automatic Turret Lathes, Vertical and Horizontal Boring Mills, Tool Grinders, Small Tools, Special Machinery, etc.
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Full Capacity
No Loose Weights
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CANADIAN MACHINERY AND MANUFACTURING NEWS

Vol. XXI No. 20

November 20, 1919

Do Not Shroud Business in Too Much Secrecy

Sane Influences Must be Set at Work to Combat the Revolutionary Doctrines That Are Being Spread in This Country—Production the Proper Basis for Payment

MORE and more large employers of labor are discussing in a public way their problems. It used to be considered that matters of policy, of employment and management were closed books as far as any but a few on the inside were concerned.

The time has arrived when those in positions of responsibility must speak out. They cannot afford to stand pat and let the agitators go ahead and do their worst.

It is high time that leaders in our industrial world were putting in their rebuttal evidence. The man who hears only one side of the story, who is told times without number that he is being robbed and plundered by his employer, who hears whisperings that he earns his wages in two or three hours every day—he should be brought face to face seriously with real facts. Let him hear that there are responsibilities as well as privileges in operating industry, and that those who would shirk the former have no right to claim the latter.

Mr. Charles Piez, president of the Link-Belt Company, of Chicago, a firm that has a pay-roll of over 2,200 men, recently spoke to a gathering of the Associated Business Papers, and in his address said:—

I believe in, and always have believed in the technical and trade papers, declared Mr. Piez. I believe that they have exerted and are exerting a very powerful and beneficial influence in advancing industry, and I believe they have a larger mission still ahead of them, a mission that will call for every bit of energy and intelligence that you gentlemen are capable of.

I am glad, too, that you have joined together for the purpose of furthering your common aims. My interest in the technical and trade press has not been of an indefinite or abstract character. It has been direct and concrete, for, in spite of many arguments from my own men, and much pressure from the outside, I have continued to believe that the technical and trade press is the most direct and the least diluted and the most satisfactory medium of advertising our goods.

I believe you gentlemen have solved very well the problem of the technical development of the industries. You have been a big factor in making industry, American industry, what it is to-day. I am not going to confine myself to the title of the address that is put down, because I feel that what I ought to do to-day is to enlist your co-operation in a considerably broader field than you have heretofore occupied.

The Menace in the Labor World

IF there is any cloud on the horizon of American business, if there is any menace to the continued prosperity of American industry, it lies in the present day labor unrest. No matter where it has had its origin—the war has brought about some of it, the rising cost of living

has brought about much of it, unfulfilled expectations have caused other parts of it—but the unrest is being capitalized to-day by a group who are not aiming at a mere improvement in the conditions and hours of labor, but who are aiming at the control of industry and the control of our great Government as well.

I don't know how many of you gentlemen are familiar with the propaganda that is going on, particularly through the foreign newspapers. There are some seven or eight hundred publications, all of them containing poisoned articles against the fairness of the distribution of the profits of industry, against the fairness of our system of government. There are something like 2,500 paid lecturers, drawn from foreign-born and native intellectuals, who put up a continuous story of the wrongs of the present wage system and the present social regime. Perhaps the biggest cause of unrest, and I have met this not only in my own business repeatedly, but also in my experience with the Fleet Corporation, is the exaggerated notion which the men have of the profits of industry.

How One Strike Was Stopped in the Bud

SOME six years ago we were threatened with a strike at our Indianapolis plant. We have there something like 2,200 men. The superintendent called me up and asked me if I wouldn't come down and address the men. I have been in the habit of getting all our workmen together and talking to them collectively for many years. I have found this to be highly effective. I hurried to Indianapolis and found when I got there that the strike was threatened not by any conditions inside of our plant, but because of some grudge against another plant in the city, with which we had nothing to do, and over which we had no control. The strike involved the machinists and tool-makers, two of the very vital crafts in our industry.

We called them together and I gave them a talk. After I got through, I asked them whether they had any questions to ask, and told them I would be very glad to answer any they might raise. One man who had been with us many years, a very able tool-maker, said, "Mr. Piez, don't we earn our day's pay in two hours' work?" And I said, "Well, now, let's examine that. How many hours a day do you work? Nine a day, don't you?" He said, "Yes."

"What do you get?"

"Sixty cents an hour."

"Then your proposition is, that you earn \$5.40 in two hours' work, for which we pay you \$1.20."

He said, "Yes, that is right."

I said, "That means that we are making a profit of \$4.20 a day out of your labor. Four dollars and twenty cents for two hours, or \$2.10 per hour profit out of your

labor. That is three and one-half times your hourly rate, and if we carried this same argument through, our profits must be equal to something like three and one-half times our total pay-roll."

I got a blackboard and went through the figures, demonstrated that if his conception of his earnings and the value of his earnings and our profits, was right, the profits of the concern would have to be something like three and one-half times our pay-roll.

This happened in March, soon after our annual meeting. I sent for our annual report, and then demonstrated that our profits for that particular man were less than a dollar per man per day, about 25% of the pay-roll instead of 350% of the pay-roll, and the expression of that man, which I can't repeat because it had some profane emphasis in it, was that he never knew our profit was so small.

Making the Most Absurd Claims

THE radical preachings in the foreign press constantly emphasize the fact that between 80 and 90% of the earnings of the individual go to the master as profit.

In the Seattle strike—and I dwelt upon that incident in a talk last week—the feeling was that the earnings of the owners were 90% of the total earnings of the man. The company got \$60.00, out of which they paid him \$6.00. Yet a very simple and quick calculation showed the absolute fallacy of that; showed that the profits computed on that conception were between four and five times the value of the annual output.

Now, that statement was repeated to me at a conference held in Washington where there were 120 representatives of labor of the Western Coast. I am giving emphasis to it at the present time because I believe that, after all, the fact that the sane-minded American workmen, intelligent workmen, have the idea that they are being treated unfairly and are receiving too small a share of the profit, lies at the very bottom of the general unrest.

I have no fear that they are going to lead the American workmen into the camp of Bolshevism, but I do fear they are going to change their perspective, because these statements are insidiously made and never refuted.

Don't Use the Shroud of Secrecy

THE manufacturers shroud their business in too much secrecy. They don't talk it over with their men. I would feel like a thief if I felt that part of the earnings of our company were filched from the men by withholding from them a just part of the earnings they have made. And on that account I am prepared at any time to discuss it with them, to be converted to their side, or convert them to mine if that is possible. I don't believe that it is wise for the industries and the employers generally to permit a misconception like that to stay unrefuted, because it is so easy to prove it to be wrong.

Now, it struck me—and I have tried to solve the question of unrest in our own industry, and I am talking to you gentlemen because I think you can be factors in settling this unrest—I have thought that the best way to reach our men, because they have grown so in numbers I can no longer reach them personally, is to reach them through our superintendents, our foremen and sub-foremen. I find that most of these men are intelligent, active, alert Americans, typically good citizens, upon whose judgment we rely to create sound public opinion, and they must be the judges of the correctness of our theories and our methods and serve as our champions.

Pays Wages on Production Basis

I APPRECIATE the remarks you gentlemen have made concerning partnership with business. I want partnership with our men, but recognize there are many ways of securing it. Partnership must be based on fairness,

and must involve acceptance of risk, as well as participation in profit. It must, therefore, be confined, in many cases in industry, to the immediate work which is under the control of the partner, and he must not be held responsible for the failure or success of policies or theories with which he had nothing to do. You can't make a partner of the man who is not responsible for the risk the partnership involves, and you can't expect a workman to sacrifice a part of his income in such a partnership. You must, therefore, confine his interest to the work under his control, and give him part of the profits which extra effort or intelligence on his part brings about.

My company has been paying on a production basis for many years, and we have had no labor troubles. We try to keep step with the conditions, but we always adhere to the policy of paying on the basis of production. It is the only fair way; it is the way every man in business, from the top down, ought to be paid.

During the war the principle was laid down that the rising cost of living should be taken account of in the payment of wages, and while this was perhaps sound doctrine several years ago, when coupled with the other restrictions with which it was surrounded, it is now pretty generally held by our labor friends that the cost of living should be the sole basis of wages, production being entirely omitted. If the cost of living is to be the basis of wages, why apply it to any particular group of workmen? Why not apply it to all? Why not determine the per cent. of advance at certain specified times, and then by fiat of the executive, raise all wages and salaries simultaneously, by the per cent. of increase? That would soon show the absurdity of the principle, for you cannot take more out of the pot than you put in it.

Gentlemen, the demands that some of the radicals are making cannot be satisfied with increased wages, for they demand nothing less than turning industry over to them. There is no justification for that kind of partnership, for the only kind that is successful in business is that which is earned and paid for.

I have bought Link-Belt stock ever since I came with the company, and I have acquired what interest I have because I sacrificed a very considerable part of a very meagre income for many years in order to buy it and hold on to it. There are 180 of our employees among our stockholders to-day, because they helped us conduct the business and helped us develop it. For years we have insisted that the older interests as they retire, surrender part of their stock for distribution and sale to the younger men. That is my idea of a partnership. It has worked well in our case and in many other plants. It is a very sound policy.

It occurred to me that you gentlemen might help very much in stilling the present day unrest. I think after all it is but a phase of after-war conditions—but a result of a transition from war to peace. It is of temporary duration, but it has to be handled well. What we have to do is to bring back the proper perspective of our men, and not let them go off on a tangent.

Now, the radicals reach the men, not after hours, but during hours. They reach them by planting in your works men who have been especially coached for the job. We had some planted in the 39th Street plant not more than nine or ten months ago. Those men talk to the other men when the foreman isn't looking, and pour into them radical ideas about the wage scale and shop conditions, and when they find a man who has a pet grievance they fill him full of the seeds of distrust. And they plant men successively who develop and spread this distrust. That is their game. Our method of meeting it is through the foreman.

The foreman isn't a good foreman unless he has the respect and confidence of the men. They must respect his ability as a mechanic, his character as a man. It is the foreman and the sub-foreman whom we ought to coach up and prepare to meet this insidious doctrine that is being spread to the detriment of the industry.

What Do We Know Regarding Hydraulics?

The Subject of Hydraulics From Both a Theoretical and Practical Standpoint is Described, Particular Stress Being Laid on the Application of This Knowledge to Fire Service

By DONALD A. HAMPSON, Associate Member A.S.M.E.

MOST men can trace their interest in the active work of fire departments back to boyhood days and the delirious joy of going to a fire with all the thrilling and noisy accompaniment. Men in the mechanical field are naturally interested in modern apparatus, its performances, and advances in the protection of life and property. In smaller cities with their volunteer fire departments and in private plants which maintain some sort of a department or other means of protection of their own, the engineering features such as the selection of new apparatus, repairs, hydraulic problems, etc., demand the assistance of someone with special training—and that someone is usually selected because of machine shop, engine room, drafting or surveying experience. With a good working knowledge of hydraulics to guide them,

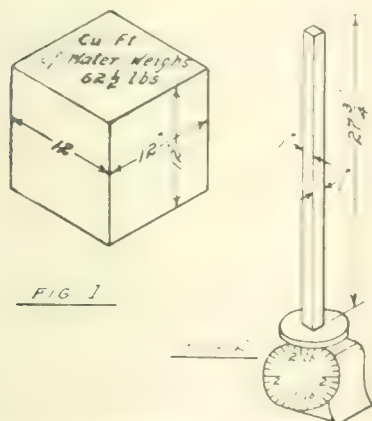


FIG. 1 ILLUSTRATING THE WEIGHT OF WATER.

FIG. 2 SHOWING COLUMN OF WATER THAT GIVES 1 LB. PRESSURE PER SQUARE INCH.

men of the machine trades are particularly well fitted to assist in this work—often at the same time gaining an unusual opportunity to appear in public life, where their business habits of getting quick, definite results in an economical manner make a unique showing alongside of the average municipal proceedings.

The Water Supply

Back of the fire department there must be a water supply. Viewed from several angles, the supply is of vital importance to all residents of a community. Except in new communities, a means of water supply has been provided, it serving for domestic, fire, and industrial uses. Many plants have their own water supply, either to assure better and quicker results in conjunction with city service or, in the case of isolated plants, to provide the only means of fire protection that is available.

Whether public or private, an adequate or a seemingly too adequate supply is a measure of economy, figured in terms of insurance premiums, if in no other. Incidentally, it may be stated that the fire loss of the world in times of peace is approximately two hundred and fifty million dollars per year!

There are three common sources of water supply, i.e., the gravity system which delivers water from a reservoir on a higher elevation; standpipes which furnish a substitute for the higher elevation and into which the water must be pumped, and some arrangement of cisterns or wells from which the water is pumped into the mains. This latter system is in very limited use—the constant expense of pumping and the restricted quantity of water available making such a system of value only in special cases, though for industrial fire purposes where a positive source of power is to be had, pumps are recommended.

Villages that are not in a position to instal a gravity system, either from geographical or financial reasons, find the standpipe admirably adapted to their needs; pumps of some sort are required to keep the supply full, but it is often possible to arrange the installation in connection with some other work, thereby decreasing the maintenance expense. Standpipes are tanks, generally of metal, set upon a solid foundation on the highest elevation near at hand. Before the general introduction of elevated tanks, standpipes were often used for factory protection.

But the most widely adopted and satisfactory water supply is the reservoir, fed by rainfall alone or in conjunction with springs and streams. Its location is selected from a number of possible sites in which elevation, watershed, distance from the community it is to serve, cost of reservoir and pipe lines, and further expansion of the system are the factors weighed in making the selection. Maintenance is but a small item if the work is well done in the beginning, and it might be added that such a water system will not only pay dividends, but it will have the distinction of being the one self-supporting department in the community. A well-laid-out system will provide an abundance of water at all times, and this at a pressure that is not so high as to cause serious leaks in the piping and yet is ample for all needs.

The Part of Gravity

Gravity plays the leading part in the great drama of water. The reservoir, or gravity system depends upon this phenomenon for its action. Nearly all hydraulic calculations contain the fac-

tor of gravity or one that is deduced from it or is a substitution. The force with which the stream of water issues from the faucet is due to gravity and is the same in amount as if the water had fallen from directly overhead the same height instead of having come through long lines of pipe—there is, however, some loss in coming through pipes and around bends.

Hydraulic measurements are not made by weight but by pressure, though as just stated the weight (gravity) is the basis of pressure. In Fig. 1 we see the familiar cubic foot of water that weighs 62½ lbs. Weights of all other substances are taken from this as unity—steel, for instance, having a “specific gravity” of about 8 and weighing about 500 lbs. for a cubic foot. If we could shape water into a rod 1 in. square and have that rod 27¾ in. high, its weight upon the scales, Fig. 2, would be 1 lb.; this is an important point—it should be memorized because the length ex-

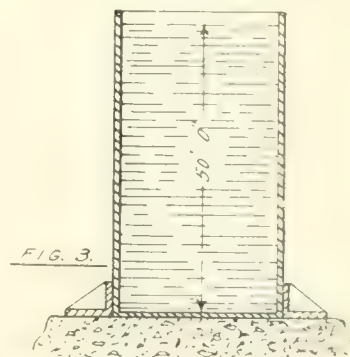


FIG. 3—TYPICAL STAND PIPE. THIS DEPTH OF WATER PRODUCES A WEIGHT AND PRESSURE OF 22 LBS. ON EVERY SQUARE INCH OF THE BOTTOM.

pressed as 2.3 feet is a frequently used factor in conversion. Our standpipe, Fig. 3, has 50 ft. of water in it—therefore the pressure on the bottom is $50 \div 2.3 = 22$ lbs. per sq. in.

That water has weight every fireman can testify, but he seldom knows how much weight. A length of filled hose is heavier than most persons would guess; a one foot section of 2½ in. hose weighs 1½ lbs., and the water it holds, 2 lbs., making a total of 3½ lbs. as seen at Fig. 6—this is 175 lbs. for a 50 ft. length of hose without fittings! Water can be compressed but a fraction of one per cent. This property makes it invaluable in hydraulic machinery where thousands of tons pressure must be maintained. Water pressure is distributed equally in all directions as may be seen by reference to Fig. 4, where the piston in the left hand cylinder compresses the water, distributing the pres-

sure equally in all directions against the walls, as contrasted to the right hand piston which bears on a block of wood which transmits the same pressure directly and solely to the bottom.

The vertical height determines the pressure at the point of issuance. This height is called the "pressure head" or just "head"—it does not matter whether the points are directly over one another or miles distant, the vertical height

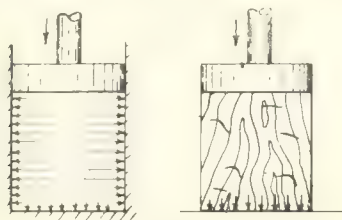


FIG 4

FIG. 4—AT LEFT WE SEE THAT WATER PRESSURE IS TRANSMITTED EQUALLY IN ALL DIRECTIONS. AT RIGHT WE NOTE THAT PRESSURE ON A BLOCK OF WOOD OR METAL IS NOT EQUAL.

remaining the same, the outlet pressure will remain the same, barring certain losses in the flow. Fig. 5 illustrates this point by an actual case from one city. Two hydrants were selected, one but an eighth of a mile from the reservoir and the other two miles away, but both having the same elevation, i.e., 150 feet below the surface of the water. Both hydrants are on the same 24 in. main, and according to the law of "head," both should show the same pressure, which they did without about one per cent.

Filters as a part of the municipal water system cut off some of the pressure—that because they are situated below the level of the reservoirs about ten to twenty feet and the water going into the mains partakes of a head based on the elevation of the filters. This means a loss of five to ten pounds pressure in the mains which may cut down the effective pressure for fire or high sections served so that pressure filters have to be installed, these being filters which have the pressure put back (so to speak) by pumps.

Besides weight and pressure, the factors of friction, velocity, and discharge figure largely in hydraulics. It is often said that water seeks its own level and rough calculations (?) are made upon such action. Water does seek its level but it never reaches it in any but a closed system, i.e., one where there are no discharges and where the water has time to adjust itself—the level is not reached until motion has ceased. The factors mentioned at the beginning of this paragraph are responsible for failure to reach the level in an open system.

The Hydraulic Grade Line

The height to which water will rise in a flowing system is shown by what is called the "hydraulic grade line," an imaginary line drawn from the surface of the supply to the last point of discharge; if at any point along the main, a tube were erected, the water would rise to that line—also if any part of the

main rises above the line or some part of the city is above it, water will not flow there unless pumped or siphoned. Knowledge of the principle of the hydraulic grade line is of interest to firemen in noting the greater pressure at some locations than others. Fig. 7 shows an easily constructed model to illustrate and prove the principle; it will be seen that the water rises to the line; but if the outlets were plugged, the water from the tubes would spurt as high as the level in the tank.

The fireman must take the water at the hydrant as it is. The path from the main to the nozzle is usually shown as by Fig. 8, and the relative areas and capacities as shown at Fig. 9. The 4 in. pipe leading into the hydrant looks much too large for the 1 in. nozzle which the fireman uses—and it would be if the rate of flow were the same in each, which it is not, a nozzle being a device to increase the speed of delivery and thus needing a large feed pipe.

The fireman works with movable equipment—pumps, hose, and nozzles. Special formulae have been worked out for use in this connection because the standard formulae of hydraulics do not fit these special conditions. In big pipes, water flows along easily—the water in the 24 in. main at Fig. 5 loses but 1 lb. pressure in two miles of travel and it discharges over 16,000 gals. per min. (contrast this with a 3 in. pipe laid over the same stretch which would discharge only 20 gals. per min. to see the efficiency of large pipes). A familiar formula for discharge is:

$$\text{Gals. per min.} = \sqrt{D^5 \times H} \div L$$

D in inches, H in feet, and L in yards.

Water is restricted in its flow by a number of factors such as—the resistance it offers to entering the pipe at the reservoir, friction in running through the pipe due to rough interior and confinement, bends in the pipe, branches leading off, and changes in the size of the pipe.

Friction

Friction is the big item of loss both in pipes and hose. Iron pipes are subject to a disease called tuberculation, a raising up of lumps on the interior, hastened and aggravated by an imperfect protecting coating at the time of

manufacture. Tuberculation not only decreases the effective area but it makes this roughness which is the cause of so much friction. There is friction of liquids just as there is friction of solids and just as a weight is more easily shoved over a glass surface than an unplanned board, so water moves more easily through smooth vessels.

Fire hose is lined with rubber to make the interior smooth, as well as to make it waterproof. The friction of water moving inside good rubber lined hose is fully one-third less than through iron pipe of the same inside diameter. But when the lining gets worn, the friction may rise 50 per cent., showing that to get the required discharge worn hose must be replaced. This friction on the interior has been termed "skin friction."

The usual way of stating friction is to speak of it as so much loss of pressure in lbs. per sq. in. or as the pressure lost in 100 ft. of hose or pipe. In passing through a hydrant there is a loss of pressure of from 2 to 3 lbs.; and in connection with this it might be added that that is less than the friction loss in a hundred feet of good hose carrying only 150 gals. per min., showing that it is false economy to space hydrants too far apart.

Friction varies:

- (1) Increases directly with an increase in length of pipe or hose.
- (2) Increases directly as the inside diameter gets smaller.
- (3) Increases as the square of the velocity.
- (4) Increases with the flow.

Rule 4 is not commonly stated because it follows from rule 3, but it has been added here to emphasize the point, for firemen are apt to expect greater discharge than is actually realized by trying to increase velocity. As velocity is simply rate of speed, naturally more water will pass through with increased velocity, but a proportionate increase is retarded because the friction increases so rapidly. Table 1 gives the friction loss in 2½ in. hose for several rates of flow; considering eight or ten lengths of hose with a given flow and with twice that flow, we see that very little pressure can survive by the time the water reaches the nozzle.

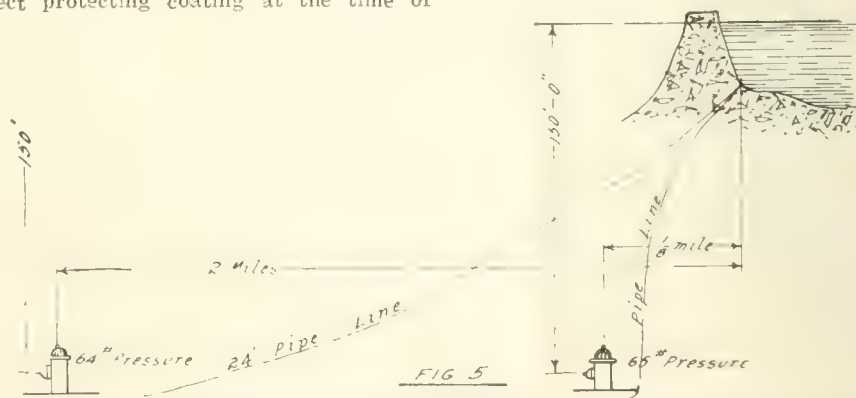


FIG. 5 ILLUSTRATING LAW THAT THE HEAD DETERMINES PRESSURE AND DISTANCE HAS VERY LITTLE EFFECT.

At the fire, the fireman has little time for hydraulic calculations. He is concerned with water where he wants, when he wants it, and with the most speed, and to attain his ends he must practise applied hydraulics, either knowingly or not. The Siamese is a device to get the same amount of water to a



FIG. 6—SECTION OF FIRE HOSE AND ITS WORKING WEIGHT.

given point without such a great friction loss as obtains with a single line, that means more water because the velocity will not have been reduced to such a great extent. A study of the right hand column of table 1 shows at once the gain resulting from the Siamese—not to know the value of the Siamese may mean defeat at a big fire or when water is limited.

Returning now to the four rules of friction we find other chances for their practical application. Rule 1 shows why long hose lines should be avoided—thus, if there is a loss of 5 lbs. pressure in one length of hose, there will be a loss of 50 lbs. in ten lengths, which may absorb the entire pressure from the hydrant. Long lines of hose have no ex-

the friction actually holds the water back and no gain is realized.

Our knowledge of friction, then, tells us that more water is obtained for fire use—by keeping the lines short, by having only hose with smooth lining, and by limiting the velocity to, say, that corresponding to a nozzle pressure of 70 lbs.

Velocity

Velocity, as a rate of movement, may be expressed as feet per sec. for water, or in the case of a train, as miles per hour. There are two sources of velocity of the fire stream—"head" and pumps, which create an artificial head. Then we have nozzles which are a device to increase velocity.

Either by reason of the heat or of inaccessibility, it is seldom possible for a fireman to get within anywhere from ten to a hundred feet of the blaze—his stream of water must bridge this space and to do that effectively it must have some force to carry there. An effective fire stream is one that will pass through a ten inch circle at the point of consideration, that has not broken up into spray at that point. The effectiveness of a stream depends upon its velocity and its discharge. If a fireman pointed the open end of a length of hose toward a fire, the hose would discharge just as much water as if it had a nozzle attached, but the water would never reach the fire, it would

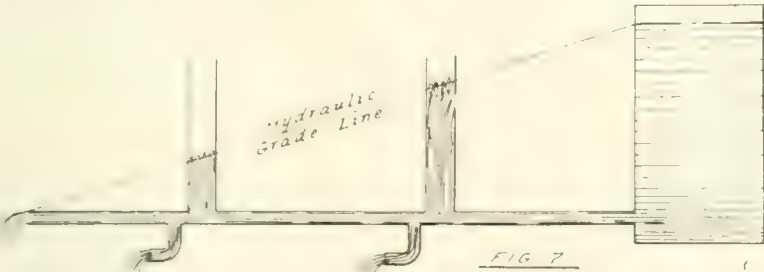


FIG. 7—MODEL USED BY AUTHOR TO SHOW THAT WATER DOES NOT RISE TO ITS LEVEL WHEN DISCHARGING PIPES ERECTED AT ANY POINT WILL FILL ONLY TO HYDRAULIC GRADE LINE.

cuse for their existence, in most cases, except to furnish work for firemen.

Rule 2 does not affect the fireman because the size of hose and water mains have been fixed long before he arrives. Two and one-half inch hose has become standard except for the high pressure service in big cities, where 3 in. hose is used. For information it will be stated that the friction loss in 3 in. hose is less than half that in 2½ in. hose.

Rule 3 shows that if the water is forced through faster, the friction increases at an alarming rate. As pre-

fall but a few feet from the open butt. The reason for this and for the use of nozzles will be made clearer by a little elementary hydraulics.

The common formula for a velocity is $V=\sqrt{2gh}$ where V is in ft. per sec. and h is the head in feet, while g is of course 32.16 (gravity). The principal

FLOW IN GALLONS PER MINUTE	1-2½" LINE	2-2½" LINES SIAMESED
50	5.9	1.8
100	10.1	2.8
200	21.2	5.9
300	36.2	10.1
400		
500		

TABLE 1.

use for this formula is in finding the velocity at a nozzle when the pressure is known, altering the formula to terms of lbs. per sq. in., as $V=\sqrt{4.6gp}$. As an example a nozzle pressure of 70 lbs. gives a velocity of $\sqrt{4.6 \times 32 \times 70}=101$ ft. per sec., which is at the rate of 70

miles per hour. A 40 lb. nozzle pressure equals 51 miles per hour, showing that a fire stream travels at a high rate. The velocity from a pipe line is effected by conditions previously named, one formula for this being

$$V = \frac{.02 \times 1}{\dots}$$

Based on this formula, the pipe line of Fig. 5 should show a theoretical velocity of 98 ft. per sec., but actual tests showed it to be only 86 ft. per sec. during the day time.

Nozzles convert volume into speed, but as the narrow passage forces the

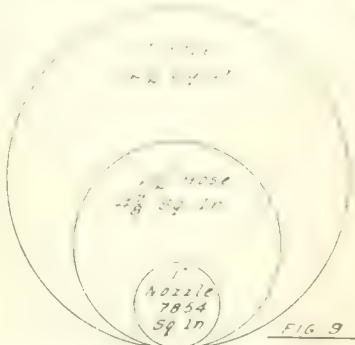


FIG. 9—ACTUAL SIZES, SHOWING ALSO RELATIVE CARRYING CAPACITY AT THE SAME VELOCITY.

brook to travel faster than when flowing through the wide meadow channel—the flow is practically the same in either case. The shape of the nozzle has much to do with keeping up the volume; thus in Fig. 10 if a hole is cut in the side of the standpipe as at A, the flow will be less than three-fourths what it would if a nozzle were applied as at B. The loss at A has been termed the "contracted vein." The velocity at the point of issuance is the same as it would be if the water had fallen a height equal to the head.

As the velocity is the "get there" of the fire stream, anything that decreases it should be avoided as much as possible. Velocity is reduced by sharp bends, roughness inside the line, fittings, and changes in size. To what survives, we owe the activity of our fire streams. The range of a stream of water discharging horizontally is illustrated by Fig. 11, and calculated by the formula $R=\sqrt{4hy}$. In fire work, the

NOZZLE PRESSURE	20	25	30	40	45	50	55	60	65	70	80	90
V.	35	43	51	64	69	73	76	79	82	85	89	92
H.	37	42	47	55	58	61	64	67	70	72	76	80

TABLE 2.

streams are seldom horizontal and there is seldom any means of knowing the head, therefore, the range—or "reach"—as it is called is found from the pressure at the nozzle, and the latter determined by a gauge applied to the stream close to the point of issuance. Nozzle pressures and fire distances vary so much that tables have been prepared showing the maximum reach on an effective stream at many

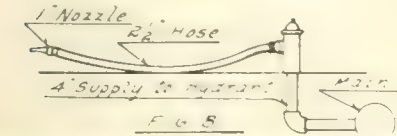


FIG. 8—SIZES OF USUAL FIRE EQUIPMENT.

viously stated in connection with flow, increasing the velocity is not always a good policy for a point is reached where

different pressures, of which the Table 2 is an abbreviation. What are called "horizontal" and "vertical" distances in the table are shown by Fig. 12. The figures of Mr. John R. Freeman, determined nearly thirty years ago, have been the recognized standard for fire streams—he fastened his hose to heavy planks for his experiments and directed them at the angles of Fig. 12.

It will be noticed from the table that

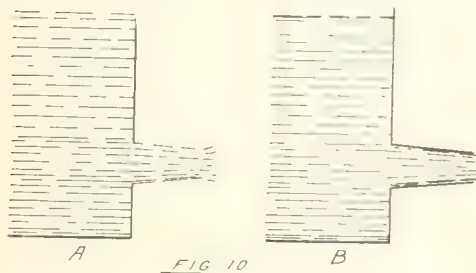


FIG. 10.

the increase in nozzle pressure is not accompanied by a proportionate increase in reach—this shows us the folly of trying to get more water, and that further, by increasing the pressure—somewhere around 50 lbs. at the nozzle is the most efficient stream. It will be also noticed that the vertical reach is greater than the horizontal. Table 2 is the reach with a 1 inch nozzle, the reach with other sizes up to 1½ inches do not vary 2 per cent. from this, showing that size of nozzle has nothing to do with reach.

Discharge

The discharge from a pipe is found from the formula to be $Q = \text{gals. per min.} = 0.4d^2 \times \text{vel.}$ Greater velocity means greater discharge both from a pipe and a nozzle. To obtain the discharge from a nozzle when the pressure is known, the formula is $D = 29.7d^2 \sqrt{p}$. As an example a 1 inch nozzle at 60 lbs. gives 216 gals. per min. This formula is near enough for practical results, but differs from actual discharges calibrated and compiled into tables—the tables give 229 gals. for the conditions named in the last sentence—the use of co-efficients brings the computed discharge up to the tables, but as it is difficult to remember these for all conditions, $D = 30d^2 \sqrt{p}$ is sufficiently accurate for field work. Due to the contraction named and shown by Fig. 10, an opening of the sort at A or the flow from a hose end—open butt—is materially reduced from that if some form of nozzle is provided, the open butt showing a discharge of only 70 per cent.

It is often desirable to know the discharge, but the nozzle pressure is not known though the pressure at the hydrant or the pump is. The discharge through lines of hose depends upon their layout—long lines of hose, hose carried up ladders, and sharp bends cutting down the discharge very much; in such cases the pressure at the hydrant or at the pump, if one is being used, does not indicate the ratio of dis-

charge—it indicates certain operating conditions which build up the pressure at that point. This pressure may be used to find the discharge by the use of a formula in which N.P. is the nozzle pressure, E.P. is the pump or hydrant pressure, L the number of 50 ft. lengths of hose, and K a constant from the table 3.

E.P.

$$\text{Then N.P.} = \frac{E.P.}{1.1 + KL}$$

An example is 2 lines of 2½ inch hose Siamesed into a 1½ inch nozzle with the pump showing 140 lbs. The N.P. then will be

$$\frac{140}{1.1 + 135 \times 2} = 104 \text{ lbs.}$$

Knowing the nozzle pressure and the size bore, the discharge can always be found by the formula previously given, for our example $D = 30 \times 1\frac{1}{2}^2 \sqrt{104} = 681 \text{ gals. per min.}$

The constant K has to be selected according to the number and size of lines and the bore of the nozzle. Only values for 2½ inch hose have been given in this table. Sometimes the nozzle pressure is known and the hydrant pressure is not and it is desired to form an idea of the latter; in such a case the discharge formula is translated into $E.P. = N.P. \times 1.1 + KL$.

It takes pressure to get water through long lines of hose with their friction and up ladders with the loss of head and weight of water and through small nozzles converting to velocity. A few localities have sufficient pressure for any fire demands, but most cities do not and the water in the mains has from 20 lbs. to 60 lbs. pressure. Pumps of the stream or motor-driven variety must then be employed for fire departments and power pumps for industrial. Pumps increase pressure—they are usually capable of increasing it beyond what hose will stand for long.

As has been said, the gauge on a pumping engine is indicative of the work the machine is doing—not of the amount of water the firemen are getting. That should be firmly fixed in mind. Enthusiasm in volunteer departments turns often to getting a high pressure at the machine instead of water on the fire. A couple of good, effective streams on the fire are better than a dozen poor ones. The same enthusiasm frequently leads to the laying of so many lines that none delivers an effective stream. The writer has seen first-class pumpers virtually useless because placed where the supply had already been tapped by many hand lines of hose—the pumper could get but little water, and this it was distributing through long lines to fearless men who

couldn't reach above the first floor. Very likely the taxpayers of that community would be asked to enlarge the water supply, when the whole trouble is lack of knowledge of hydraulics by those in charge.

Lines which are carried up ladders or through water towers or standpipes do not discharge the amounts of the formulas given unless first the engine pressure is decreased by an amount which is the height of rise multiplied by .434. The gain in carrying a line up a ladder or in a building is that of obtaining a better point for play of the stream—there is no gain of velocity or discharge.

Where there is a pumper, it is of interest to know its capacity as compared to the delivery of the main from the reservoir or as compared with some stream that may flow through the town and which might be called upon to supply water for a serious fire. Very few streams of size that have not had their flow measured at some time or other—suppose that it was found to be 31,000 gallons per minute—that would equal the rated capacity of thirty-one pumpers of standard 1,000 gallon capacity; or,

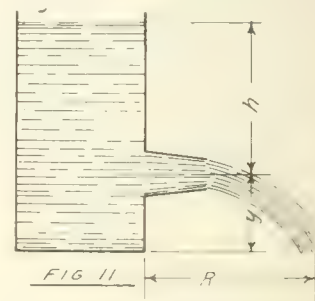


FIG. 11.

considering the main in Fig. 5, that will deliver about 10,000 gallons per minute, which equals the delivery of ten machines of the assumed capacity.

The selection of the best kind of pump is a matter of local conditions. A pump for stationary fire service may be of the gear type, centrifugal, or piston pump, the triplex pump of the latter type being highly in favor with the underwriters. The matter of drive for the pump has much to do with the type selected; for instance, the centrifugal pump makes a good outfit in combination with either an electric motor or a steam turbine for the drive is direct connected, and such a set is compact and efficient.

NOZZLE SIZE	1 - 2½" LINE	2 - 2½" LINES SIAMESED	3 - 2½" LINES
1"	155	225	
1½"	167	243	
2"	248	266	229
2½"	305	35	261
3"	307	242	15
4"	35	373	190

TABLE 3.

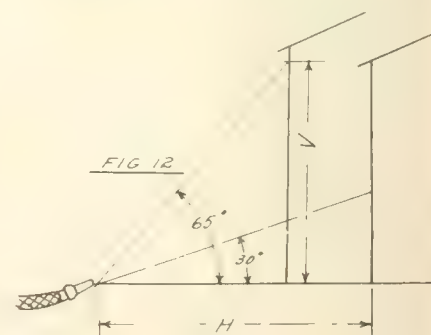


FIG. 12.

For use of the fire department, the modern trend is almost wholly toward motorizing. The steamer which has served so faithfully in the past has been outclassed by the gasoline pumper, which by this time is thoroughly reliable, and which has far greater capacity and speed than the steamer of the same weight. Only in Northern localities is there raised an objection to motor apparatus—that of inability to negotiate snow of depth. However, at time of the heaviest snow falls it is impossible for horses to draw any but light loads, and for a team to pull a heavy steamer is practically the same. During the severe blizzard of 1915, one third-class city was so tied up that not a vehicle of any sort moved for three days, except a seven-ton motor-driven pumper, newly pur-

chased, which the driver in his enthusiasm took from the house against orders and successfully made a round of the town.

There is the usual three types, gear, centrifugal, and piston, to select from in the purchase of a motor pump. The gear pump is used by the most manufacturers, and is well and favorably known. Its objections may be summed up as pulsations of the stream and of the hose (not serious), wear of the gear teeth, and trouble with foreign matter if drafting from open water. The centrifugal pump has all the good qualities of stationary centrifugals; the centrifugal is a velocity pump, the pressure it delivers increases with the square of the velocity of the impellers. As there are no close-fitting parts it

does not deliver a positive amount of water at all times, and it will not pump at pressures much over 200 pounds per sq. in.; having no fitting parts, it cannot create a vacuum, and when drafting, has to be primed. Its efficiency is the lowest of all the pumps, 65 to 70 per cent. on the verge, but its freedom from trouble and ever ready qualities make it desirable for fire service. Stationary pumps of this type are used for the high-pressure systems in all the big cities.

The piston pump, gasoline driven, has proven quite successful, one make (Ahrens-Fox) having performed a feat never attainable with the steam-driven piston pump, i.e., that of pumping water to the top of the Woolworth Building in New York.

Canadian Machinery Drafting Course—Part VII

We Now Take Up Orthographic Projection, Showing Proper Representation of Objects. These Are All Simple Pieces Found in General Working Practice and Should be Carefully Studied

By J. H. Moore, Associate Editor, Canadian Machinery

THE subject of projection drawing (or orthographic projection as it should be properly termed) is one of very vital importance, and one which, to make a success of this course, must be given fairly good space and treatment. In order to make the same interesting to the students in general, we will use (as far as possible) objects with which the machine apprentice is entirely familiar. In this way the subject becomes more interesting, and the fact that the machine apprentice knows from actual experience that such objects really exist, guarantees that the apprentice in the drafting room will likewise be well aware of their existence. Perhaps a good heading to begin with would be the statement as follows:

The Representation of Objects

In Fig. 1 we will illustrate a clamp of the usual nature found in most machine shops. Its uses are varied, as far as the various styles of machines used on, but as is well known, its main function is to clamp. This object is drawn as it actually appears when the eye of the observer is in some certain position. As can be well understood, this sketch at Fig. 1 does not show the true length of the various lines, in fact this sketch is simply known as a perspective drawing. Such a sketch is of no practical value to the machinist or tool maker, except to show what the object looks like. Of course, on a simple piece, such as this illustrated, one could easily work from the same if dimensions be placed on it, but without dimensions it is useless as an actual working drawing, for in no way can you measure the true length of the lines.

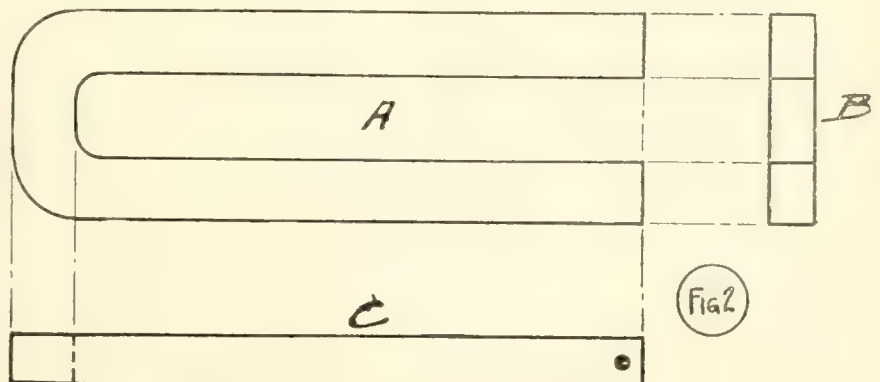
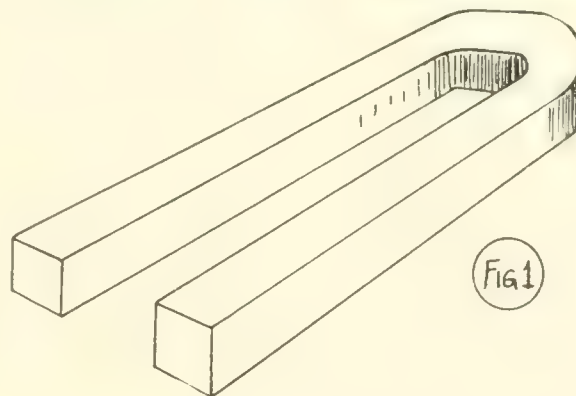
In order to represent this object in such a manner that any line can be mea-

sured directly we employ the method called projection drawing. In a perspective drawing various sides are shown but in a projection drawing only one side is shown at a time, the others being hidden.

Let us illustrate this point by referring to Fig. 2, which shows the same

clamp drawn up by the projection method. First let us consider the view A. This view is what is termed a top view, or plan view, namely a drawing which represents the object as if it were resting on a horizontal plane, and the observer looking at it from above.

But from this view we get no idea



how thick this clamp is, and if the slot runs clear through its thickness. In other words we must have a front view, or front elevation. To get a complete idea of the side appearance of the clamp we need a side view or side elevation, so we will now proceed to view B at Fig. 2, where we see the front elevation, that is the view drawn by imagining the eye to be so situated that the observer looks directly at the front of the object.

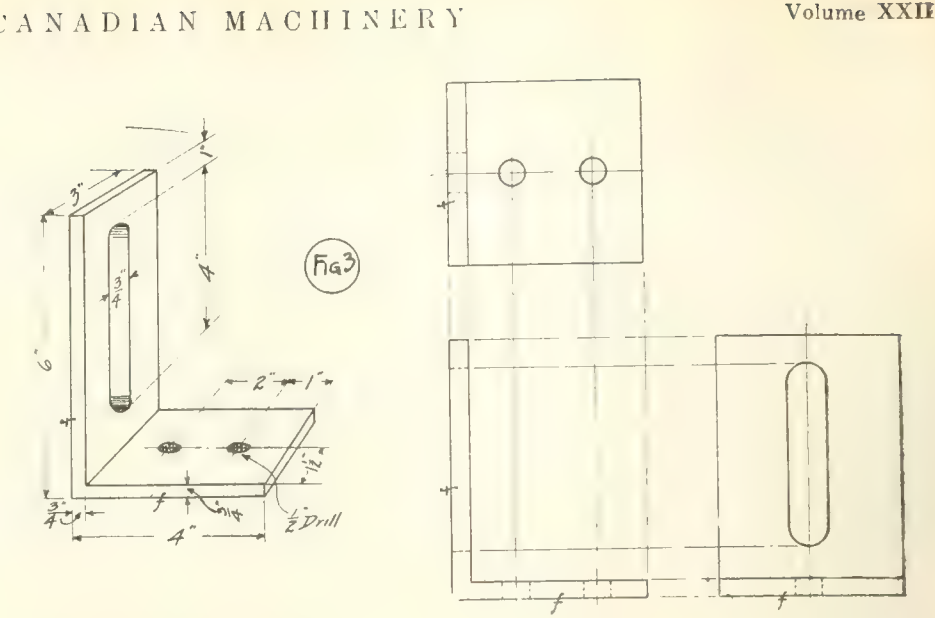
The result is clearly shown. The side elevation is now drawn, as if it were projected on a vertical plane at right angles to the horizontal plane. The projection of such a view would look like that shown at C.

In order to show these various views in a manner that one view cannot be mistaken for another, they are always arranged on the drawing in a certain fixed and invariable manner. Fig. 3 illustrates another well-known object, namely an angle plate. To illustrate the principle clearly we give dimensions on the perspective sketch, from which we will proceed to make a projection drawing.

Starting at the plan, we draw the view shown at A. We next project the two elevations as illustrated. It is a matter of taste which of these three views you start on, for it makes no difference which is drawn first, but the general arrangement is always as shown.

Any departure from this standard arrangement should be guarded against, but should for some reason or other, the draughtsman decide to change the relation of these views, he should state clearly on his drawing the change made and why.

The broken centre lines are used to show the connection existing between the different views of the object, and to



indicate axis of cylindrical surfaces of any kind, but as the best method of following out a subject of this nature is by an actual study of the objects, let us go on to discuss plate No. 7.

As per usual, 9 x 13 in. is to be the actual drawing size, and 9 1/2 x 13 1/2 in. the trimming sizes. Preserve the 1 in. space at the bottom for title purposes as usual.

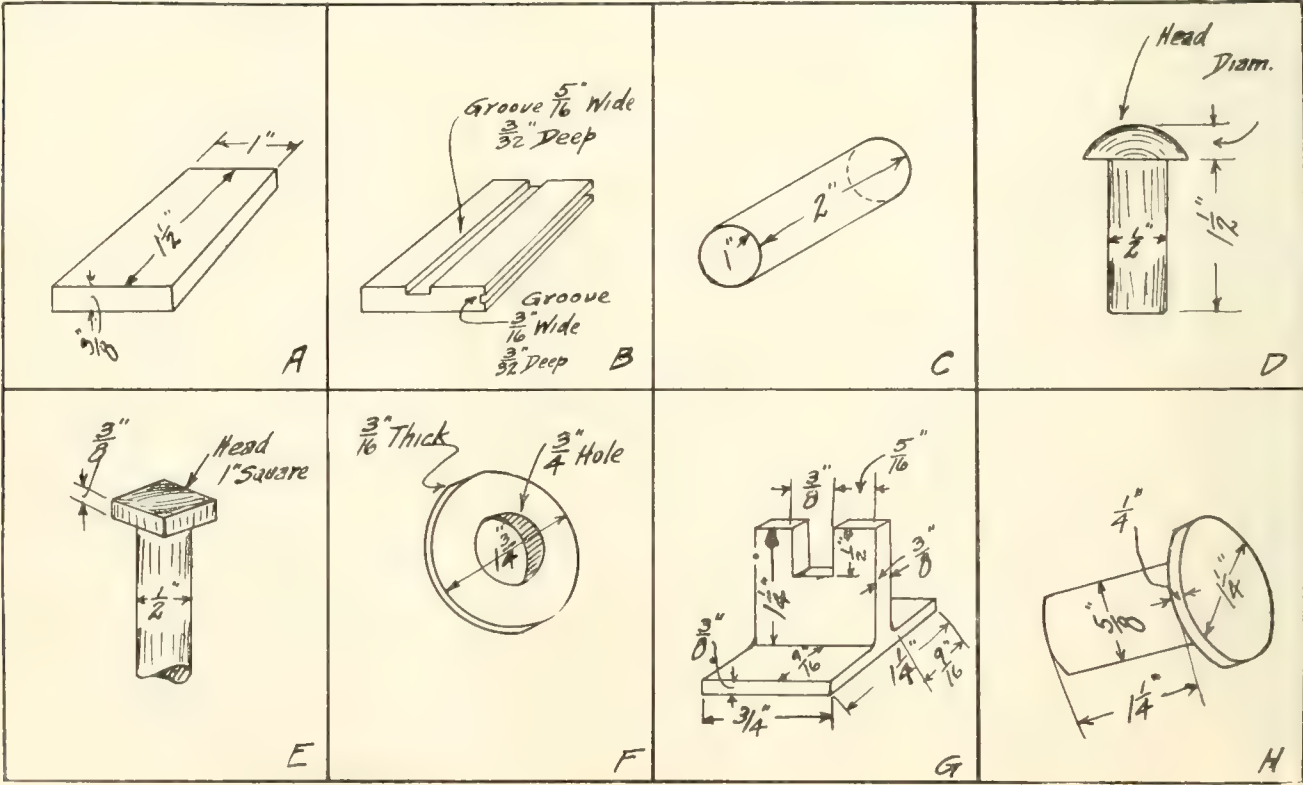
To aid the student we illustrate a chart at Fig. 4, showing rough sketches of the various objects about to be discussed for projection drawing on this plate.

A, the first object, represents a tool steel block 1 1/2 in. long, 1 in. wide and 3/8 in. thick. B represents this same block after a groove had been cut on two of its sides as shown, these grooves being 5-16 in. wide on top, and 3-16 in. for in the more difficult cases of projec-

wide on side, each being 3-32 in. deep. At C is illustrated a cylindrical piece of tool steel, while D represents a rivet of the round button head type. E shows a square head bolt, while F represents a round washer, numbers of which can always be seen around a machine shop, of all thicknesses.

In each case dimensions are given, so that to transfer from the perspective to projection becomes an easy matter.

Students will notice that for the objects, C, D, E and F, only two views are given. The reason for this is no doubt self apparent, namely that were we to draw a third view of these pieces, it would be simply a repeat of the side elevation, for the pieces being round the front and side elevations are similar. This, of course, does not always apply,



tion more views than even the three already spoken of are required, owing to the intricate nature of the object, but as this is really a more advanced subject, we will keep for the present to the three views, or two as the case may be.

We have divided this plate No. 7 into 8 parts as shown, leaving the last two spaces vacant, for a good reason.

In order to make sure that students have grasped the principle of projection, we have illustrated on Plate 1 two objects G and H. These objects are well known, namely: first, G is a small, simple bracket from a machine. All dimensions are plainly marked. H represents a flanged piece of work, usually made up in most machine shops for various types of work.

Now, the object is as follows: Study these sketches carefully, then draw up your idea of what a projection drawing of these pieces would look like.

Put all dimensions on the various views on this plate, and use the illustration of plate No. 7 as shown with this article for a guide. Above all stick to it, and send us your work. The long winter evenings are here, so you have plenty of time and by following up this course you are building up something which will bring you returns at some future date well worth the present sacrifice.

INTERESTING EXHIBIT

The Exhibit of the Black & Decker Mfg. Company, at the November Jobbers' Convention in Chicago will consist of a complete line of the Black & Decker Lectroflator electric air compressors, portable electric drills, electric valve grinders.

The outstanding characteristics of the electric air compressors is their unit construction, the motor gearing and compressor being built into one housing. The portable electric drills and electric valve grinder are unusually attractive in appearance and are distinguished by "The Pistol Grip and Trigger Switch," a patented method of control similar to an automatic pistol.

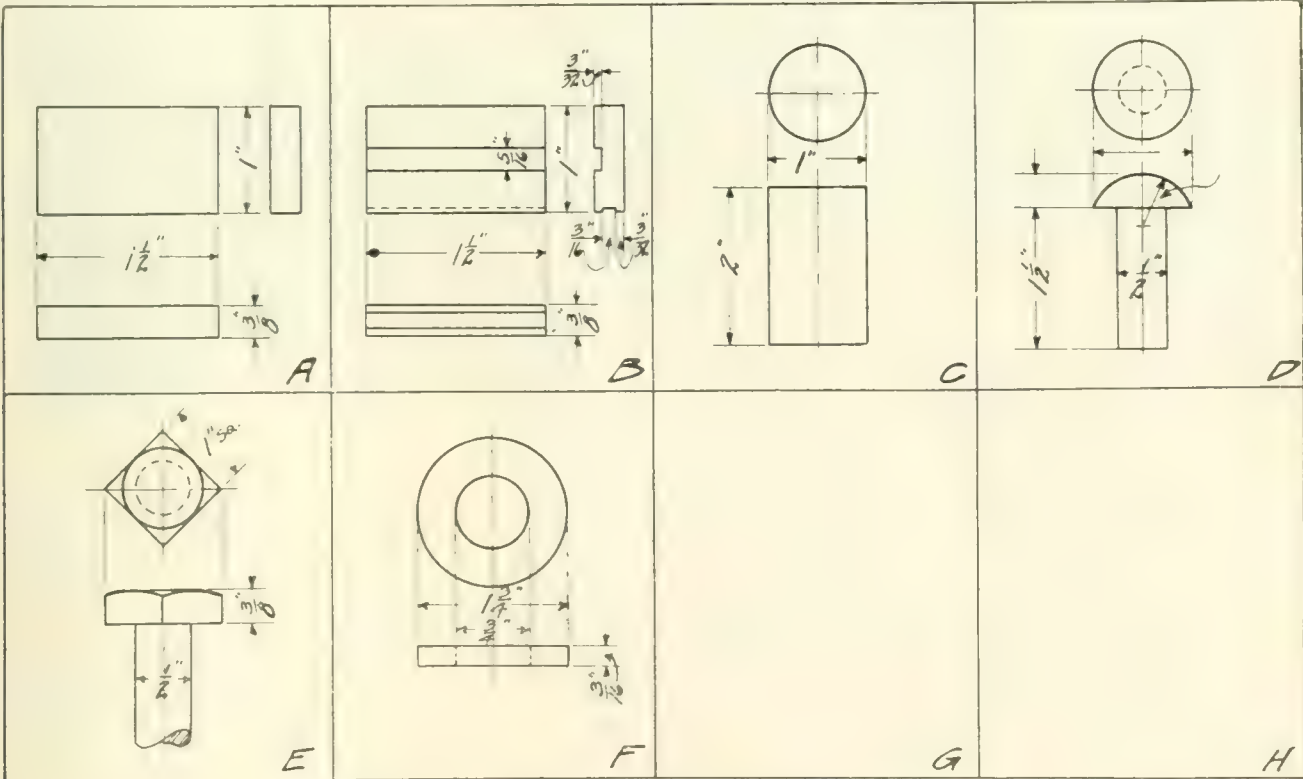
The display racks on which the Black & Decker valve grinders and drills will be shown are the same as are being given to the company's stock jobbers for displaying these goods effectively in their stores. They are quite elaborate metal racks nearly six feet high and hold one electric valve grinder and four different size electric drills. They are black enamel and at the top of each is an enamel sign bearing the company's name and arranged with holders for circulars. The supplying of these racks in large numbers to company's stock jobbers throughout the country and in fact all over the world, is an interesting example of advanced merchandising.

Actual electric air compressors, electric drills and electric valve grinders, cut out to show their construction and

operation, will be attractively mounted on hexagonal display boards—the company's trademark being hexagonal in shape—and the various cut-out models will operate under their own power at slow speeds in order to demonstrate the actual functioning of each part. Complete sets of parts for the different machines will be shown, also mounted on hexagonal boards. Elaborate preparations have been made for next year's campaign, the details of which will be disclosed at the shows by those in charge. For this purpose elaborate portfolios have been prepared, showing the products and going into some detail in regard to their merchandising, showing the type of advertising which the company has been doing and the various sales helps which they have prepared for their jobbers.

It is hoped to make the exhibit unusually attractive, interesting and instructive, and it will doubtless create considerable favorable comment, as it is more than an aggregation of products miscellaneously displayed.

New Bridge Over Niagara. — The C.P.R. has been surveying a route for a new bridge to carry their tracks over the Niagara River. The bridge would be located about one and a half miles above Black Creek. The survey has had the effect of raising property values along the route, and large sums have been paid for farms.



CANADIAN MACHINERY DRAFTING COURSE

NAME

ADDRESS

PLATE No 7

A Unique Ore Unloader for Lake Steamers

This Device, Known as the W.S.M. Automatic Ore Unloader, Has Many Points of Interest Which Will Appeal to Our Readers in General

THE automatic unloader shown in the accompanying illustration is unique in design and has proved through many years of service to be a most successful device for unloading ore cargoes from lake steamers. Although of immense proportions, the design has been simplified and the control perfected to such a point that the machine is the last word in delicacy of control and operation.

The unloader consists of a main framework mounted on trucks which travel along the runway rails which are located approximately as shown in the photograph. The main framework extends back to the rear runway over a temporary storage pile where the ore can be discharged if desired. Between the

being out of balance, the bucket descending by gravity as soon as the brakes of the hoisting mechanism are released.

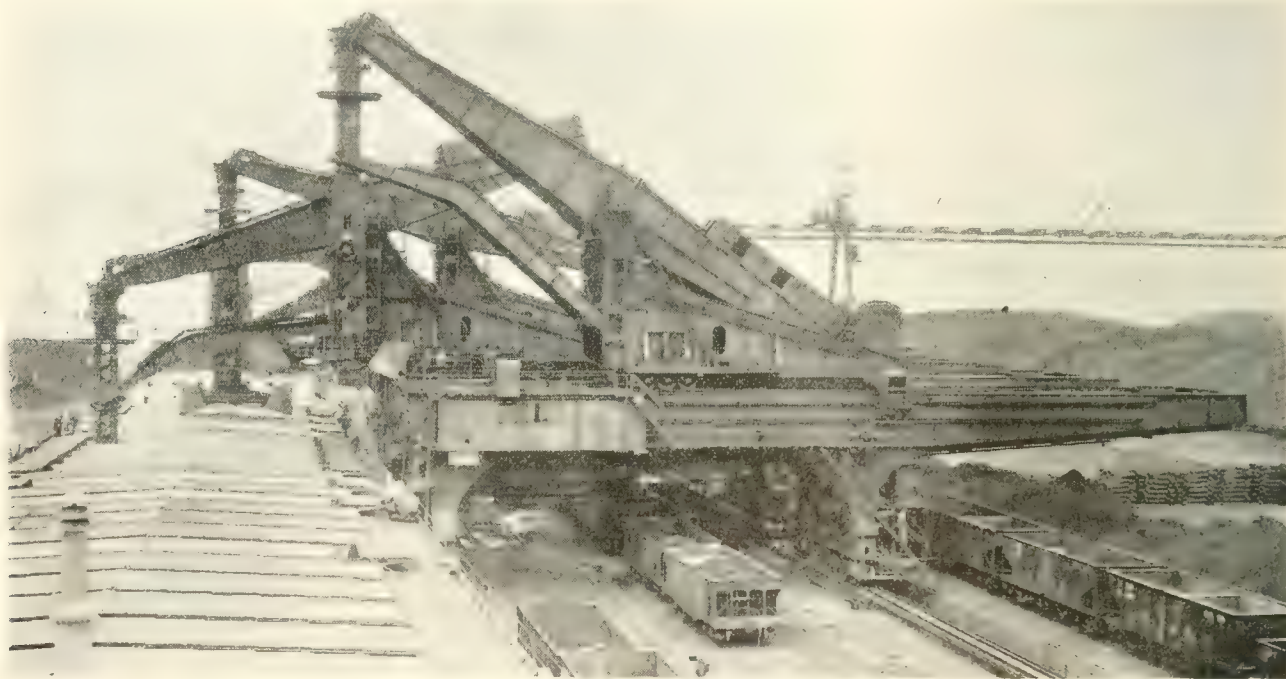
The hoisting mechanism controlling this operation is located in the enclosed house at the rear end of the walking beam. Ropes from the winding drums of this mechanism pass around sheaves located in the rear end of the trolley and are anchored to the rear end of the walking beam.

In addition to the main parts of the machine which we have described, there is also a receiving hopper located at the forward end of the main framework and between the main girders, provided for the purpose of receiving the ore discharged from the bucket. The capacity of this hopper is about three full bucket

function is solely one of unloading the cargo from the ships.

Machines of this type have been made in two sizes, the smaller size having a capacity of ten tons, and the larger size (such as is shown in the photographs) having a capacity of seventeen tons in the bucket shells. The machine shown here is electrically operated throughout and its speeds are regulated so as to operate through a complete cycle in about 50 seconds.

Some idea of the capacities of unloading by this method may be derived from a record which was made in Ashtabula by eight machines of this type having a capacity of fifteen tons each, unloading seven boats having a capacity of 70,000 tons in twenty-two hours' actual time.



CLOSE UP VIEW OF THE UNLOADERS AT WORK.

front and rear runways space is provided for railroad tracks where ore-carrying cars are placed under the machines and loaded with ore for transportation to the furnace plants. The girders of the main framework form a support for runway rails on which a trolley travels. This trolley supports a balanced walking beam, from the outer end of which a stiff bucket leg depends. At the lower end of this leg is the bucket, which is operated by machinery located on the walking beam. All horizontal movements of the bucket are accomplished by means of moving the trolley backward and forward on the girders. The vertical movements of the bucket are accomplished by the operation of the walking beam. The forward portion of the beam

loads and its purpose is to act as a balancing point for the ore between the bucket and the cars or storage as the case may be. The bottom of the hopper is provided with outlet gates, and the contents discharged as required into a lorry, which runs on an auxiliary track suspended from the under side of the main girders.

The lorry, after receiving its load from the main hopper, moves to a point so that its contents can be discharged either into the cars standing on the railroad tracks beneath the main span of the girders or into a temporary storage pile under the cantilever at the rear of the machines. The ore so placed in this temporary stock pile cannot be reclaimed by means of these machines as their

At other points four machines working in boats having capacities up to 13,000 tons have unloaded these cargoes in about three hours and twenty-five minutes.

The operation of the machine is as follows:

After the boat has been placed alongside of the dock, the machine is moved opposite one of the hatches and the bucket is lowered through the hatch into the ore. After filling the bucket the walking beam hoist mechanism is put in operation and the bucket hoisted out of the boat. At the same time, the trolley is traveled back so that the bucket is brought over the main hopper between the girders in the main framework and its contents is discharged into this hop-

per. The bucket is then immediately returned to the boat for another load. The ore in the main hopper is discharged into the larry which has been brought to a point directly underneath the discharge gates of the hopper. The larry hopper is filled and the larry is moved

into position so as to be handled by the bucket.

The motor for operating and closing of the bucket is located in the main larry house at the back of the walking beam. Ropes from this bucket-closing mechanism are carried through the walking

bucket leg itself, the ropes being carried back in the walking beam to a rotating mechanism which is located adjacent to the bucket-closing mechanism. The bucket leg itself is carried on a roller bearing which is attached to the top end of the leg. This motion is introduced for the purpose of turning the bucket at right angles to the hatchway in order to scrape its front a foot or two away from the boat as possible, thus the bucket is enabled to reach out under the hatches and remove ore which is not directly beneath the hatch opening. The distance from point to point of the bucket shells when open is approximately 21 feet.

The scale larry, into which the main hopper discharges, has a capacity of between 35 and 45 tons, and two larry loads are intended to constitute a full carload of ore. The arrangement of the discharge gates of the larry is clearly shown on this photograph. They are suspended from the sides of the larry frame and operated by connecting rods which attach to cranks, also connected to the main larry frame, these gates being operated by means of a small motor which is carried at the rear of the larry. The gates are so arranged that all or a portion of the contents of the larry may be discharged. The hopper of the larry is suspended in the larry frame on scales so that the contents of the larry may be wholly or partially discharged and be accurately recorded.

The mechanism for moving the larry back and forth on its track is also located on the larry and consists of winding drums upon which ropes are wound, the end of the rope being attached to the rear end of the cantilever on the main framework. The larry track is in-



DOCKS AT ASHTABULA. EIGHT UNLOADERS ARE USED, EACH WITH 15-TON BUCKET. 75,000 TONS IN 24 HOURS IN CAPACITY OF THESE DOCKS

over the desired discharge point and the gates of the larry hopper are opened, discharging the ore as required. The larry hopper is provided with scales so that the contents is accurately weighed and recorded. In this way a car can be loaded to its allowable capacity and an accurate record kept of the amount of ore so discharged into the car, thus eliminating the necessity for the use of track scales.

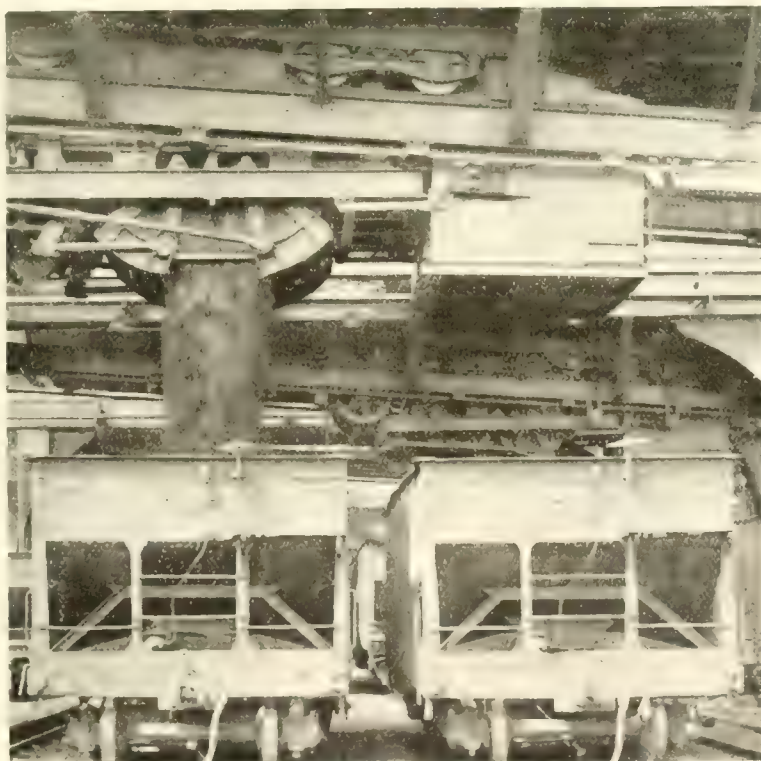
If railroad cars are not available for immediate shipment the larry is traveled to a position on the rear cantilever and its contents discharged into a temporary storage pile, from which it is usually reclaimed for shipment or storage by means of a bridge located on the runway at the rear of the unloader.

Only two operators are required for the entire operation of one of these machines. One of the operators, whose station is in the bucket leg directly over the bucket shells, controls all of the motions of raising and lowering the bucket, of traveling the trolley back and forth and moving the machine along the dock from one hatch to another. The second operator is stationed in a cab on the larry and from this station he controls the movement of the larry, the operation of this larry gates and the weighing of the ore.

The bucket shells are each made of a single piece of plate formed to the shape as shown on this photograph. These bucket shells are usually provided with manganese steel cutting lips, which are essential to resist the abrasive action of the ore. The bucket shells themselves are carried on heavy cast steel arms mounted on rollers traveling in guides in the fixed portion of the lower end of the bucket leg. The position of the operator who controls the operation of the bucket, etc., as previously described, is also shown on this photograph. The view shows the bucket in operation in the hold of the modern ore carrier after most of the ore has been removed and the balance of the ore has been scraped

beam and the bucket leg and attached to a power drum in the bucket leg directly over the operator. This power drum is geared to the closing chain drums, one of which is shown on this photograph. The bucket is opened by reversing the motor and the bucket shells are forced open by means of an opening chain located in the centre of the bucket leg between the two closing chains.

In addition to the vertical movement, which is given to the bucket leg by means of the walking beam, it also has a motion of rotation around its vertical axis. This is accomplished by means of ropes attached to a segment on the



Scale larry, into which the main hopper discharges the ore. This larry accurately weighs the ore and discharges it into storage. Cars thus loaded are ready for shipment as they do not require reweighing.

clined and the larry is pulled up the incline by means of these ropes and descends by gravity.

As previously stated, these machines are usually electrically operated through-

Points of superiority claimed for this Wellman-Seaver-Morgan Ore Unloader are as follows:

The design is very heavy; there is little to get out of order, resulting in

The operator travels with the bucket into the boat, and can always see exactly what he is doing.

The bucket is of extremely large capacity, but is so suspended from the walking beam that the weight resting on the tank top of a boat is less than one-third of the weight of a rope-suspended bucket of equal capacity. In fact it is impracticable to use a rope-operated bucket of anything like the size attained on these unloaders.

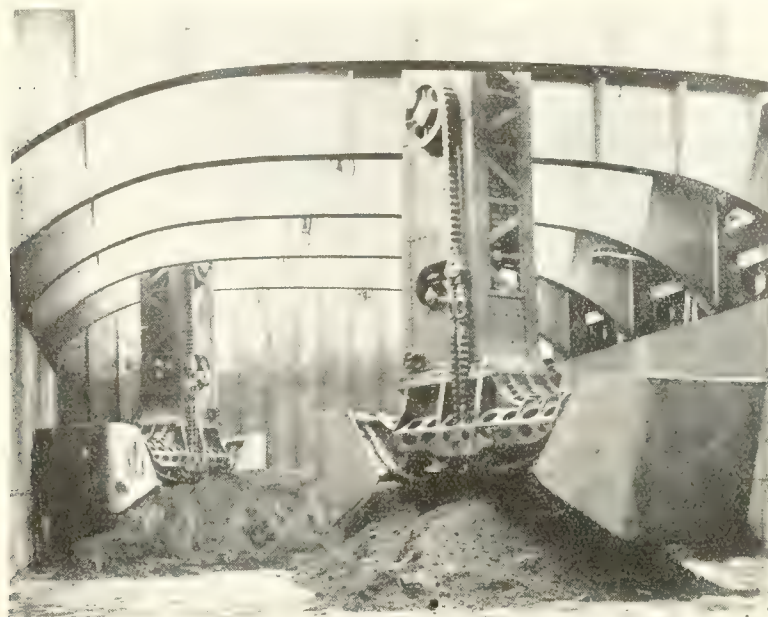
One particularly important point to be considered is the extremely low cost obtainable with these machines. Records extending over long periods show unloading cost ranging from 2½ to 4½ cents per ton, which includes superintendence, labor, repairs and materials on the machines, as well as the cost for power and light.

On account of the high capacity of these machines, the number of units required is less by a considerable margin than of a smaller type lighter machine, which results immediately in a decreased cost of operation for the reason that a fewer number of skilled operators is required.

Again, on account of the extreme reach of the bucket, it is possible for the machine to discharge a very much higher percentage of a ship's cargo than can be accomplished by ordinary rope-operated buckets. The bucket can be rotated at right angles to the hatch and reach out for ore which would be entirely inaccessible to an ordinary bucket.

It can be conclusively shown in plants where large tonnages are to be handled that there is a distinct saving in first cost as well as a yearly saving in the cost of operation over any other type of machine.

This unloader is not a combined machine. It is an unloader pure and simple, and it accomplishes its work well.



Unloader Leg and Bucket at work in the hold of a modern boat are shown above. The leg is so mounted in the walking beam that it can rotate in a circle, allowing the bucket to reach out in all directions. These machines have often unloaded 97 per cent. of a cargo without the help of shovelers. The position of the operator who controls the movements of the bucket is shown above. The distance from point to point of the bucket shell when open is 31 feet.

out. In some cases, however, machines of the same general type have been made to operate by steam and hydraulic cylinders, water being supplied to the operating cylinders by means of a steam accumulator, which furnishes water at a pressure of 1,000 pounds per square inch. Electrically operated machines are usually designed for a 220-volt direct current. Alternating current is never used. The motors required for the equipment of one of these machines are as follows:

low maintenance cost per ton of material handled.

The control is accurate and positive, and manual labor is reduced to a minimum.

The bucket is positively guided in passing through the hatches of ships, thus eliminating the danger of damage either to the boat or to the machines, arising from the use of rope-suspended buckets.

The Canadian Engineering Standard Association

IT IS not generally known that we have in Canada an association known as the Canadian Engineering Standards Association.

The Purpose of the Association

The Canadian Engineering Standards Association was formed in 1919 with the object of carrying out in Canada, for the benefit of Canadian industry, work similar to that done in England by the British Engineering Standards Association, which has proved of such great industrial value. The Canadian Engineering Standards Association is not a Government institution, although it is recognized by the Canadian Government. The members, who serve on its committees gratuitously, are qualified by their technical and industrial standing to represent the interests of manufacturers, engineers and users, and are nominated by such bodies as the Canadian Manufac-

turers' Association, the Canadian Mining Institute, the Engineering Institute of Canada, the engineering schools of the universities, the railway services, important industrial firms and the great purchasing departments of the Canadian Government.

The association has now been incorporated by Dominion charter.

The association is supported by contributions from the technical and industrial societies interested, as well as from individual firms, and these are supplemented by a grant from the Dominion Government.

Method of Work

When a request or suggestion is received from some responsible firm or person to the effect that the formulation or revision of a Canadian standard is desirable, the association confers with the various interests likely to be affected by the establishment of such a stand-

Motor H.P.

Beam hoist	1	275
Bucket closing	1	120
Bucket rotating	1	25
Trolley travel	1	120
Hopper gates	1	100
Longitudinal travel	1	100
Larry travel	1	150
Larry gates	1	40

The control equipment for these motors is of the magnetic switch type throughout, having master controllers in the operators' cabs in the bucket leg and on the larry.

Electric current is supplied to these machines by means of insulated conductor rails running the length of the main runways. The current is collected from these rails by means of pickup shoes and distributed to the various portions of the machine. A similar collecting device is also employed for supplying the main current to the trolley. Conductor rails are attached to the main framework of the machine and the current collected from these rails by means of pickup shoes attached to the trolley.

ard, and arranges for the organization of a committee to consider the matter. This committee includes representatives of the producers and users of the standard in question together with such technical advisers as may be considered desirable. The selection of such a working committee is accomplished through the proper sectional committee of the association under the chairmanship of a member of the association. If the committee so formed recommends the adoption or modification of a standard, its findings are reviewed by the association, the main committee of which must be thoroughly satisfied that full consideration has been given to the subject before it authorizes publication by the association.

The actual discussions as regards technical details are thus carried out by specially chosen representatives of the manufacturers and purchasers, and the various interests, whether of the producer, the user, or the engineer, are safeguarded, since all these parties have a voice in the decisions reached. In this way it is clear that before a report, defining a Canadian standard is issued or modified, the effective approval of all concerned will have been obtained.

The services of the various sectional and sub-committees are of course available for the periodic revision of their reports, this being necessary in order to avoid any risk of retaining a standard in use after improvements or changes of practice have rendered it obsolete in any respect.

There is reason to believe that the success of the work done by the British Engineering Standards Association in the past has been largely due to the careful way in which its main committee has reviewed the work of its various sectional and other committees.

The C.E.S.A. standard specifications will, as a rule, contain simply the technical clauses necessary for the purchase of the product to which the specification relates, together with such tables and diagrams as may be required for their explanation.

Meaning of Standardization

In order to avoid misunderstanding it may be pointed out that the term "standardization" refers primarily to the preparation of such designs, dimensions or specifications in industrial, manufacturing, or construction work as will be generally accepted and worked to by all concerned. In the case, for instance, of a machine component, if its principal dimensions and characteristics are standardized, the number of types or patterns to be made or kept in stock commercially is at once reduced, lessening accordingly the cost of manufacture and handling, with corresponding saving and convenience to users.

An example of economy attained in this manner would be afforded if the various Canadian railway administrations would agree with the steel makers to adopt a standard Canadian section and specification for rails and track fastenings. This action would not only reduce the number of different rolls to be cut

and used by the rail mills, but would enable material to be rolled for stock direct from the billets at less cost and with a certainty that they would be acceptable to any railway. The railways would simplify their practice, avoiding the use of rails and fastenings differing in form and material only in comparatively unimportant details, and would benefit by the higher and more uniform quality of the product. Some progress towards this desirable result has already been made.

Similar opportunities for substantial saving in the cost of manufactured products and for protecting the interests of the user now occur in many other Canadian manufacturing industries wherever articles and materials may be so standardized by common agreement between the producer and user as to permit their production in economical quantities while still satisfying the requirements of the purchasers. No organization has hitherto existed in Canada for bringing these various interests together and inducing them to agree on a mutually satisfactory design or specification.

The Canadian Engineering Standards Association, like the British Engineering Standards Association, does not as a body decide upon the details of its standards, but organizes and reviews the findings of a representative committee for each particular standard suggested, thus insuring that all interests are properly considered and making certain that any recommended standard has been carefully investigated before it is issued. No standard that is not based on mutual agreement arrived at in this manner is likely to receive general endorsement and adoption.

Since the commencement of their activities three months ago, great progress has been made.

Requests for action have been received and committees have been formed, or are in process of formation, dealing with the following subjects: Aircraft parts, electrical work, rails and track, wire rope, steel bridges and construction, with the view of obtaining agreement on Canadian specifications or standards which will be acceptable to all concerned.

In this work, consideration will of course first be given to any existing specifications or standards which have proved satisfactory in Canada, Great Britain, and the United States for similar work.

This association has been requested by the British Engineering Standards Association (the corresponding organization in Great Britain) to undertake the distribution of its publications in Canada, and for this purpose has been furnished with most of the reports of the British Engineering Standards Association. The list to follow does not include all the publications of the British Engineering Standards Association, but covers those of most recent issue. Copies are for sale at the prices stated.

Report No. C L 3750. "Interim Memorandum on French Metric Screw Threads for Aircraft Purposes," 15c net.

Report No. 10-1904. Revised July, 1918. "British Standard Tables of Pipe Flanges," 25c net.

Report No. 15-1912. Revised August, 1912. "British Standard Specification for Structural Steel for Bridges, etc., and General Building Construction," 25c net.

Report No. 21-1909. Revised November, 1909. "Report on British Standard Pipe Threads for Iron or Steel Pipes and Tubes," 25c net.

Report No. 37-1919. Revised January, 1919. "British Standard Specification for Electricity Meters," 25c net.

Report No. 41-1908. "British Standard Specification for Cast Iron Spigot and Socket Flue or Smoke Pipes," 25c net.

Report No. 44-1909. "British Standard Specification for Cast Iron Pipes for Hydraulic Power," 25c net.

Report No. 45-1917. Revised September, 1917. "Report on British Standard Dimensions for Sparking Plugs for Internal Combustion Engines," 25c net.

Report No. 46-1909. "British Standard Specifications for Keys and Keyways," 25c net.

Report No. 63-1913. "British Standard Specifications for Sizes of Broken Stone and Chippings," 25c net.

Report No. 65-1914. "British Standard Specification for Salt-Glazed Ware Pipes," 25c net.

Report No. 71-1917. "Report on British Standard Dimensions of Wheel Rims and Tyre Bands for Solid Rubber Tyres for Automobiles," 25c net.

Report No. 72-1917. Revised September, 1917. "British Standard Rules for Electrical Machinery." (Excluding motors for traction purposes), 25c.

Report No. 74-1917. Revised September, 1917. "British Standard Specification for Charging Plug and Socket for Vehicles Propelled by Electric Secondary Batteries," 25c net.

Report No. 75-1916. "British Standard Specifications for Wrought Steel for Automobiles," 25c net.

Report No. 76-1916. "British Standard Nomenclature of Tars, Pitches, Bitumens and Asphalts When Used for Road Purposes and British Standard Specification for Tar and Pitch for Road Purposes," 25c net.

Report No. 82-1919. "British Standard Specification for Starters for Electric Motors." (Face-plate type), 25c net.

Report No. 84-1918. "Report on British Standard Fine (B.S.F.) Screw Threads and Their Tolerances," 25c net.

Report No. 88-1919. "British Standard Specification for Electric Cut-Outs for Low Pressure, Type O," 25c net.

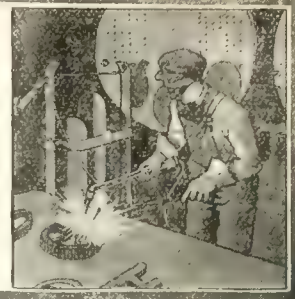
These reports are concise and complete and well worth the price.

Requests for copies of any of the above should be addressed to:

The Secretary,
Canadian Engineering Standards Assoc.,
Room 112 West Block, Ottawa,
and should be accompanied by money order payable to the:
Canadian Engineering Standards Assoc.,
Ottawa.



WELDING AND CUTTING



Army Welding Schools*

By R. J. KEHL†

ORIGINALLY the shop work of the Ordnance Department was planned to come under two heads: namely, mobile repair shops and base shops.

The mobile shops organized quite elaborate courses of instruction, which were given at the Rock Island Arsenal, at Peoria, Illinois, Clintonville, Wisconsin and Kenosha, Wisconsin. Because those shops were to be sent to France one at a time, it was quite possible to arrange good courses of training for their men. Men who had some welding experience and when who were good mechanics, but who had had no previous experience in oxy-acetylene welding were given instruction at these schools.

In the case of base shops, conditions were entirely different. It was expected that all the base equipment and personnel would arrive in France early in the spring of 1918. These shops, therefore, endeavored to enlist men who had had considerable experience in oxy-acetylene welding, as well as for the other trades required for the shops. It was, of course, understood that there would not be enough first-class operators, but it was thought that we would be able to train men in France, using them as helpers to the experienced welders.

When I arrived in France, in March, I went immediately to Advance Depot No. 1. The first machine shop, which had been erected in December, had been burned down, and the second shop was just about ready to commence operating. Considerable machinery had been damaged in the fire, and in transportation, and a great deal of welding work had to be done before the shop could be run in good shape. When I inquired as to why a welder had not been put on the job, I was told that they did not have one. They had had a blacksmith who claimed to know quite a bit about welding, but he had made a failure of every job which he had attempted, so, although they knew that their only hope for getting the shop running was to employ the oxy-acetylene process, nevertheless they had very little faith in its ability.

The only equipment at the depot was a French combination welding and cut-

ting blowpipe, which operated off a portable acetylene generator of about 25 pounds carbide capacity. There was no oxygen regulator with the outfit. A copper tube about 1/8-inch in diameter carried the oxygen to the blowpipe at cylinder pressure. Four cylinders of oxygen, and two of acetylene, of about 150 cubic feet each; about 10 pounds cast iron rods, all square, and most of them larger than 3/8-inch, and about 5 pounds square aluminum rod over 1/2 inch, were all the supplies on hand.

Lump carbide was the only size available, so it was necessary to break carbide to charge the generator, as the instructions said, to "the size of coffee."

After the generator had been put in operation and the blowpipe started, it was apparent that a new beginner could not be trusted with that apparatus on work that could not be allowed to fail. Therefore I had to do practically all the welding myself, using the men only as helpers, except for a few cutting jobs, for the first five weeks.

About the first of May we received in salvage, a good French outfit, consisting of a welding blowpipe, a cutting blowpipe, oxygen regulators, and an acetylene regulator. With this better equipment we were able to get along quite well.

Soon the mobile shops commenced coming through the depot to receive final instruction in artillery material and other work for which the men were to be specialists with their particular shop. Some of the welders with these shops were excellent operators, some had had instruction in the mobile classes in the States, but a great many, although they were classed as welders, knew practically nothing about welding, or at least good welding practice.

Most of the work up to July was repairs to broken machinery and equipment for our own shop, the local railroad repair shop, and other branches of the service at the depot, and some artillery repairs.

To give instruction on work of this sort was a pretty difficult proposition. Men who were good mechanics and adapted themselves readily to welding, received considerable training, and quite a few good operators were turned out. But those who did not adapt themselves to welding readily, and should have been given the most attention and practice, did not receive it, because they could not

be trusted to do anything but the simplest jobs.

The work covered a broad range of repairs and included jobs which ordinarily would not have been attempted. Such parts as typewriter arms, typewriter carriage ways, various small arms parts, automobile springs and very badly broken castings were attempted and successfully handled. The only job which failed was a small white metal casting.

Dozens of levers, arms, hand-wheels, brackets and pulleys for various machine tools were welded for our own shops each week. For the Air Service, a broken shaper base, aluminum magneto brackets for generator sets were repaired, and some lead burning was done. For the Railroad Shop, only locomotive brackets, levers, and other small work was welded by us, the larger repair work being sent to the main railroad repair shops, about 150 miles back. For the Motor Transportation Corps, cracked engine cylinders, motorcycle forks, worn valves, and other automobile and motorcycle repairs were made. Even several dozen automobile springs were welded because of the inability to obtain new springs to replace them. Broken truck and tractor parts were repaired for vehicles received from the States and uncrated at the depot. Hot water heater sections and automobile repairs were handled for the Red Cross.

Perhaps the most complicated job was a three-step pulley for a 16-inch lathe, which had fallen down from the shafting and was broken into 15 parts, all the way from small pieces to one piece about one-third of the pulley. This job required considerable patch work and scheming to insure the pieces being true and to avoid cracking as each little piece was gradually added to the main part.

Various parts of gun mounts, gun carriages, and other caissons were repaired. Many of these were bronze. Machine gun tripods which had come in in salvage with corners shot off, holes pierced through them, and otherwise damaged, were welded, straightened and put back in service. Upon several occasions, advantage was taken of the oxy-acetylene blowpipe to apply local heat to trails which had been distorted in action.

The cutting blowpipe was used to cut I-beams for shafting stringers and to rough out large quantities of wrenches for the 75-millimeter gun repair too-

*Paper read at Annual Convention International Acetylene Association, N.Y.

†Engineer Oxweld Acetylene Co., formerly First Lieut. Ordnance Dept., A.E.F.

sets, to save time, machining. The ball and the base of railroad rails were sliced off so that the machine shops could use the stock to make lathe and shaper tools. By careful manipulation of the cutting knife, gun cradles were notched or split as the case required, to permit the removal of the gun and recoil mechanism from field pieces which had been badly damaged in action.

In July the shops received orders to make up about 200 Howitzer mounts, each of which required two butt welds on 2-inch round steel bars, and two corner welds, each 15 inches long, on $\frac{3}{4}$ in. plate. After the shops had been on this work for about a week the welders were falling behind because of lack of equipment. At that time the engineers at the depot received a 100-pound portable Oxtel generator, with welding and cutting equipment. After considerable negotiations they finally consented to loan us their generator and equipment on the basis that we would handle all their repair work. When I say that we had eight men doing nothing but break lump carbide down to the size required for the generator you will realize that the generator was being heavily taxed.

Because most of the men were to go out with mobile shops, and would have to depend upon their own ability and skill, an effort was made to have them appreciate that the success of welding depends more upon the correct handling of the work than just upon running in the filling rod. They were instructed to study the different possible methods of a job and to then select the method which would ensure the best results. They were trained to watch the whole work, while doing the actual welding, and be able to reason out the cause of any difficulty they might encounter and be able to overcome or counteract the cause.

It was quite difficult to obtain supplies from the French, both rods, fluxes and gas supplies, and as a matter of fact most of our supplies came from the Quartermaster's Department, and we had to taken woven wire and unwind it for weaving wire. Hundreds of tons of supplies for the different departments did not get to France until August and September. The initial supply, from twenty-five to fifty pounds, that came with each outfit, was used up within a couple of weeks after outfit was put into service, and we had to depend on the French as far as we could for our supply, and they were not very generous with it. An order for five pounds of rods had to go through the Minister of Munitions at Paris.

SOLDERING FOR SHOP MEN

By Donald A. Hampson

Repair and maintenance work calls for ability to turn one's hand to many a trick that is foreign to every-day machine shop practice. Soldering is one of these tricks, yet a great many machinists are totally unfamiliar with such work, or have only seen it done, while still others despise such a method of making repairs. Soldering is not to be despised—it fills a very definite place—

a good soldered joint is better than a poorly welded one. Many jobs that could easily be fixed up with solder are repaired by more expensive methods and by renewals. It is not a hard matter to make a good job of soldering if a few essentials are understood, nor is there required any expensive equipment.

Cleanliness is the first and last requisite for a successful job. The surface of the work must be mechanically and chemically clean. Mechanical cleanliness is obtained by machining, filing, and scraping, together with the use of emery cloth that has not been contaminated with dirt and grease. Brass castings may be soldered on the surface if clean, but with cast iron it is necessary to cut or file off the outer surface or skin to expose the fresh metal. Cleaning should be carried a quarter of an inch beyond any part which the solder will touch so that by no chance will be work be retarded by the iron's slipping on to an unclean spot and thus carry dirt back to the joint being made.

The chemical cleanliness is obtained by the application of muriatic acid to the surfaces being joined. This provides for all necessary cleaning and prevents oxidation of the surface during the work. If it happens that the work pieces are galvanized or of zinc, then the commercial acid is used just as it is, but if any other metals are being handled (and the majority of jobs are such) then the acid must have dissolved in it all the zinc which can be absorbed by the acid; this "cut" acid is ready for use and is preferably prepared in small quantities so as to have always fresh acid on hand, and that as clean as such things can be kept which are being dipped into and exposed to air and swabs.

Sal-ammoniac is the most commonly used flux for soldering. Rubbing the hot iron over the surface of this is sufficient. Some men imbibe a small amount of solder in a cake of sal-ammoniac and tin the iron by rolling the iron around in this hole, but it cannot be said to be good practice, for the hole gets constantly bigger and less efficient, finally getting bored clear through the cake, spoiling a chunk that at present prices may be worth two or three dollars. Tinsmiths invariably keep the surface of such a cake flat on top and use a holder or container that allows the greatest wear from the rather expensive chemical in use, a couple of movements per side of the iron is all sufficient.

Both the iron and the work must be "tinned" before any kind of a job can be done. This is the second great law of soldering. Oil, grease, dirt, all these prevent the tinning of iron and work, and they have to be removed. Tinning is the process of coating the surface with a thin layer of solder. So far as the work is concerned tinning may be done as a separate operation previous to joining the two pieces, or it may be done as a part of the work with the pieces clamped together. The iron, however, is always tinned before it is applied to the work. Soldering jobs are usually either joining two separate pieces together or

filling up cracks, and in both cases it is preferable to tin the surfaces separately because when that is once done it is an easy matter to place more solder in the form of a bond between the two in whatever form or amount is desired.

Some materials resist tinning more than others. With those that offer greater resistance, patience is required to secure the coating, and the iron must be rubbed for some time on the surface before the result is secured, in the meantime keeping dirt and oxidation from accumulating. It is a help in tinning cast iron to coat the surface with a thin layer of copper by rubbing on blue vitriol, the surface having first been machined or filed.

Lack of heat is a detriment to soldering, in fact, most beginners fall down on this one point, and they try to solder with a cold iron and to make solder stick to a cold surface. The iron itself, however, should not be overheated; this is a common mistake around machine shops where the forge fire is used to heat, and where it is very easy to raise the iron to red heat. Soldering "irons" are made with a copper bit, and the red heat is injurious to copper; moreover the red heat burns off the tinned surface of the iron, necessitating doing this part of the work over again. A temperature of 400° Fahr. will melt solder, and there is no need to go a great deal above this.

The function of the iron is three-fold: to carry the solder to the work, to heat the work, and to distribute, or place the solder where wanted. If the iron consisted of the point only, it would fail in the first two functions, but it does not, and we have a large mass of copper back of the point which feeds the heat down to where it is used. Where sheet metal is being soldered the heat from the iron is sufficient, but where the parts are bulky it is preferable and quicker to heat the work in some sort of a clean flame, bringing the work up to about a straw color on steel.

Cast iron requires more heat than steel or brass. Aluminum requires a hotter iron than the other metals and also a special aluminum solder. Ordinary solder will not stick to aluminum; usually aluminum is soldered without any flux, or if any is used it is a specially prepared composition.

Separate parts being jointed by soldering require some sort of fastening to keep them together and in true relation until the bond has cooled. The work may be clamped on a surface plate or held in a vise, or it may be screwed and riveted together, or it may be wired.

Shelburne. — The Shelburne Shipbuilders, Limited, launched a fine three-masted schooner from their yards recently. She was built for the W. & T. Hollett interest, of Burin, Nfld., for their fleet of coasting vessels. The new vessel was christened Donald II, registers 230 tons, and has the 12 years' classification in Bureau Veritas. The keel for an auxiliary schooner is laid in the same yard.



DEVELOPMENTS IN SHOP EQUIPMENT



A "NEW CRANE" 40 YEARS OLD ENTERS THE FIELD

The Lane Manufacturing Co., Montpelier, Vt., established for 70 years, built their first rope-driven overhead travelling crane about 40 years ago. Many of these cranes installed in the early eighties are still rendering full service.

Until this year, all efforts of this firm have been confined principally to the stone working field. About 1893, with the increased development of electric power, the Lane Crane was adapted to electric drive, and during the past twenty years a large number of these electrically driven cranes have been installed largely in their original field—the stone-working field—throughout the country. Although most of the installations have been in the New England States, Lane Cranes are now in service in many states from the Atlantic to the Pacific.

Hence, although so long established, it is easy to understand why this type of crane has not been better known in fields outside of the stone-working trade.

They have now appointed as their sole crane agents, N. B. Payne & Co., 25 Church street, N.Y., who will make it their business to give this crane a broad distribution throughout the United States—wherever cranes are needed. Herewith, are a few of the arguments that are being presented by N. B. Payne & Co.

Two Motors Give Three Movements

A notable characteristic of the Lane Electric Crane is the employment of two

motors for three movements. Both motors are the constant speed, non-reversing type, which eliminates the use of controllers and complex wiring. Control of all movements, including that of direction, by means of a series of friction cones, is mechanical.

This design effects a saving in electric power which is ordinarily lost in frequent quick stops and reversals, and speeding up or slowing down of variable speed reversing motors.

Originally Lane Cranes were furnished with timber bridge girders, stayed with steel truss rods fastened to cast iron bridge trucks and having a safety factor of about 7. This construction has the advantage of being exceptionally light for a given capacity. Where desired timber bridge girders, as shown in Fig. 1, are still furnished. In fact, bridges are now supplied in three styles:

No. 1.—For short spans; rolled steel I beams, reinforced with inverted channels riveted to the top flanges when necessary.

No. 2.—Steel girders of the lattice box section type for long spans, Fig. 2.

No. 3.—Heavy timbers of long leaf yellow pine, reinforced by large steel truss rods, as shown by Fig. 1.

In all cases, these bridges are designed with a large factor of safety—at least 5, and with ample strength to sustain the load without undue deflection, horizontally or vertically.

The bridge girders of this crane are supported by cast iron end trucks, provided with cast iron double flange chill-

ed wheels, which have steel axles running in renewable bearings. The trolley is made of cast iron, is designed for rigidity, compactness, accessibility of all parts, and is suitably reinforced with steel tension rods. The sides are joined together by several large steel shafts. Power for hoist and trolley movements is transmitted by friction cones through steel worms, engaging bronze gears running in oil. These friction cones are plainly visible in Fig. 3.

The worm-gear drive is a simple and effective load brake, being controlled by a convenient hand wheel. Two speeds of the hook are furnished with one part of rope. A luff block is provided with a hook and hinged housed sheave, so that by running the line through this sheave and attaching the single rope hook to a girt on the underside of the trolley a two-part reaving of the rope is effected, thereby dividing the first two speeds by 2 and doubling the power, supplying 4 hoist speeds.

For example: The following are approximately the speeds for a 10-ton standard crane.

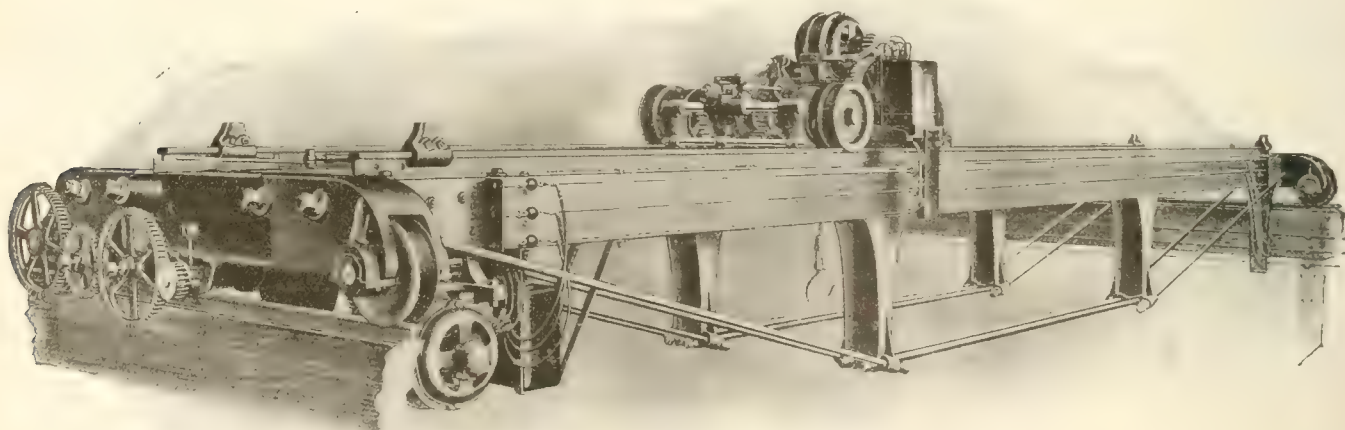
No load—40 feet per minute with one part of rope.

2½ tons—20 feet per minute with one part of rope.

5 tons—10 feet per minute with two parts of rope.

10 tons—5 feet per minute, with two parts of rope.

The hoist motor, through the same power cones, operates the trolley motion on the bridge at approximately 100



GENERAL VIEW OF LANE OVERHEAD ELECTRIC CRANE.

feet per minute. The reverse is obtained in the same manner as with the hoist movement. All movements are controlled by hand wheels. There is no complicated wiring, there are no large controllers and there are no hot resistances, hence, no ability to handle delicate electrical equipment is required of the operator.

The bridge motor drives a friction disc by transmission through a pair of opposed cones, alternately contacting therewith. Control of the bridge travel movement in either direction is effected by shifting the cones by means of a lever connected to a rod running the full length of the bridge convenient to the operator's left hand.

A distinctive feature inherent in this crane is the control of all movements by the operator while seated on the trolley. There he always has a clear view over the hook as well as of all other points below the crane.

In practice, expert crane users have found that the operator is able to place the load quickly and with accuracy, also effecting a saving of considerable time in placing the hook for attachment to the load. The comfort of the operator in sitting at his work is a feature worthy of consideration.

Readers may be interested in a book of testimonial letters on Lane Cranes in the possession of N. B. Payne & Co., which is available to anyone interested.

In summing up, it is claimed by the manufacturers that this crane has five special points of superior merit, as follows:

- 1st: Maximum longevity of service—a record of 30 years.
- 2nd: Minimum power and repair cost.
- 3rd: Great overload capacity.
- 4th: High return value on capital investment: and
- 5th: The crane can be operated by inexperienced labor.

ATTRACTIVE CATALOGUE

The Canadian Foundries and Forgings have issued a very attractive catalogue, No. 1, on their line of drop forgings and drop-forged tools, produced at the Canadian Bridge and Structural Plant, Welland, Ont.

In this catalogue is shown a full line of forged steel wrenches of all kinds, also illustrating their display board for such tools.

Machine, engineers', double head S, 15 double head, and general service wrenches are shown, also various adjustable and automobile types. Knife handle wrenches, Stilson wrenches, screw-drivers, pliers, hammers, turn-buckles, thumb nut blanks, weldless eye nuts, eye bolts, forged steel nuts, drop-forged crank shafts, connecting rods, etc., etc., are shown throughout this book.

To anyone interested in drop forgings or wrenches, this catalogue will be a splendid addition to their library.

NEW BULLETINS

The Hergi Manufacturing Co., 75 Third Street, Bridgeport, Conn., have issued attractive bulletins Nos. 10, 11, 12 and 13 on their line of portable electric machinery.

Various grinding wheels, the spring outfit, scraping outfit, and screw-driving outfit are described in detail. To anyone interested in such a line of machinery, this booklet will prove well worth while.

FORGED CUTTER TOOL HOLDERS

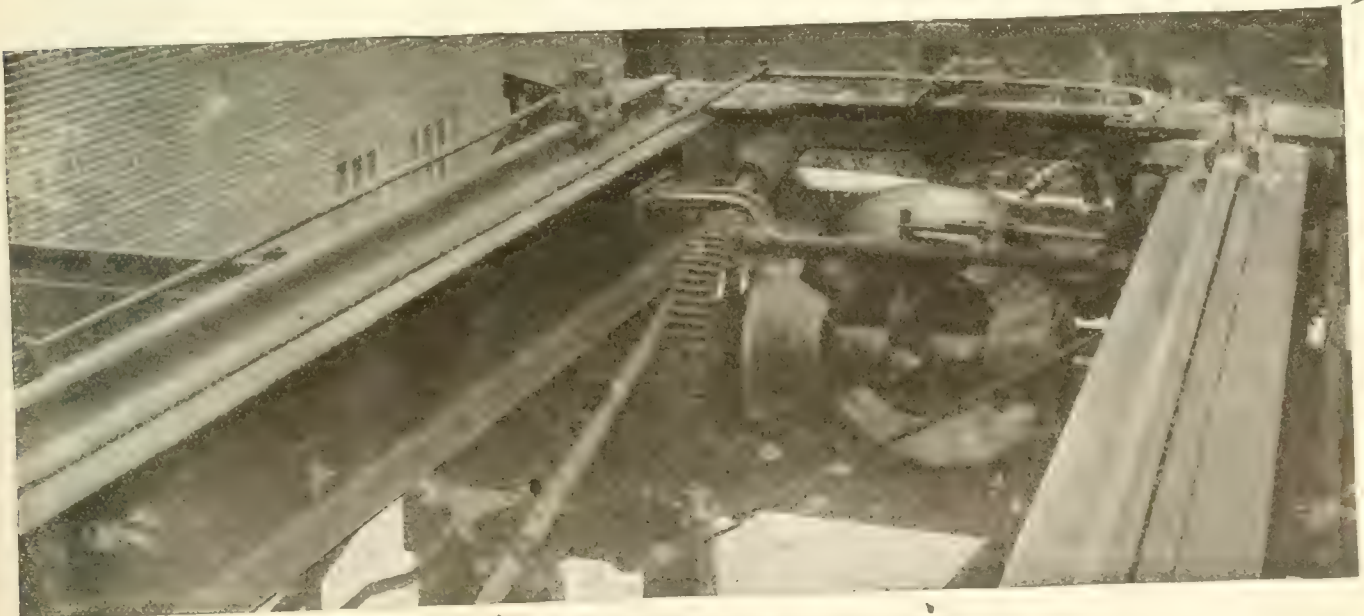
J. H. Williams & Co., with works at Brooklyn and Buffalo, N.Y., have added to their well-known line of "Agrippa" tool holders, their new system of cutting tools, Williams' "Vulcan" forged cutter tool holders. Holders which embodied this principle, making possible the use of what is practically a solid tool without its expense, were first designed and

have been developed and perfected to meet the demands of those who prefer the solid, forged type of tool. This construction eliminates the great cost of the old, solid tool and at the same time retains its advantages; each holder, by the mere insertion of small high-speed forged cutters, is adapted to the heaviest service in any regular machining operation on lathe, planer, shaper, etc. Consequently the economy and convenience of this line, when installed as standard shop equipment, is at once apparent, as all blacksmith work, to say nothing of the very considerable investment necessitated by heavy, solid forged tools of costly high-speed steel, is eliminated.

The supply of cutters for such a shop can be maintained in readiness for instant service by the man in charge of the tool room at practically no expense for grinding, so that the machine operator may have constantly available an ample stock for all regular needs. Duplicate lines of important shapes and sizes with but slight additional investment will insure the operator against interruption; he may thus devote his entire attention to production only.

The holders are all drop-forged from a fine grade of special steel, so heat-treated as to develop its maximum toughness and stiffness. They are very simple in construction, being composed of but three parts: holder proper, square head cam, and locking pin, all of unusual strength and exceptional wearing quality; they hold the cutter in an immovably rigid grip. The construction is shown by phantom cut.

The cutters, extra heavy in design, are drop-forged from "Agrippa" high-speed steel, and are finished and hardened ready for use. They are furnished in a wide range of sizes and types. Side, diamond point, roughing, hog nose, flat nose, threading, etc., etc. The method of locking provides the necessary bearing to support the cutting pressure and prevents all rocking movement of the cutter itself.



VIEW SHOWING THE FRICTION CONES.

The MacLean Publishing Company

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Is the Victory Loan Secure?

NOW that the people of Canada have given to the Government of the country over \$600,000,000, the question arises, "What are they going to do with it?"

It is not a very hard matter to finance a country or an institution or an individual as long as the money hangs out. A good way to judge the effect of this sort of business on a nation is to judge it on an individual, for after all, a nation is simply a collection of individuals.

Take any man and hand over to him plenty of money, and he will get along nicely—for a time.

Take any country and hand over to its Government plenty of money and it will get along nicely—for a time.

What develops men is to get out and work and plan and sacrifice.

And the same things that develop men will develop nations.

It is a good thing for a Government, if it must owe money, to owe that money to its own people. The payments of interest go to our own people, and the holder of bonds feels a new and a greater interest in his country. It may be selfishness, but he realizes that the country must pay him back his money, and it is up to him to make the country able to discharge that obligation. Everything he can do to make the country more capable of paying its debts is increasing the security that he likes to see surrounding his investment.

Canada's ability to pay back her debts is not going to be increased by an adherence to the idea that your part in the work is cutting down output and increasing costs.

Canada's ability to pay is going to come from her applied ability to produce, to grow, to manufacture and to sell, and also by her determination to get down to national brass tacks and live nationally within her means.

Floating a great national loan is all right for ex-

ceptional and pressing circumstances, but it cannot be continued. It would simply mean tying an additional financial millstone around our national neck every year, until we had defied the laws of strength and resistance to such an extent that the whole superstructure toppled over.

If you are going to live in this country, you have got to look at the future of this country in a big way. If not it will be doing the country a kindness if you get out.

Canadians must realize now that the hurrahs of the Victory Loan have subsided, that with this accomplishment they have taken on a very serious responsibility. The people of Canada owe themselves millions upon millions of dollars, and it is the people of the Dominion who have to pay this money back to themselves. That may be a homely way of stating the case, but it is the view that should be brought home to the people now, from the apprentice right on through to the president and the general manager.

Always in the Student Period

HAVE you stopped your studies? Have you gone ahead very far since you passed from the apprentice or improver stage to that of the full-fledged journeyman? Has anything grown except your pay envelope and the cost of living?

There's many a man who has made the fatal mistake of stopping just when he was getting into a good stride. There's a lot of them who have gone in on some switch with a blind end, and a car shunter to stop them from going any farther.

Never be too old or too busy to learn. If there were things you missed during your apprenticeship, get after them now whenever the opportunity comes to do so. Do not, for instance, if you are a man on the machine or the bench, imagine that drafting is good only for the man in the drafting office.

Writing to CANADIAN MACHINERY a few days ago, Mr. A. M. Lount, master mechanic of the Massey-Harris Co., Toronto, brought this point out in speaking of the drafting course that is running in this paper:—

"In comment of the same, would say that the writer has found several of his men are following this course, and is very pleased with the idea, but would suggest that some little article might be prepared which would call attention strongly to the point that a course of this nature is particularly valuable to the man on the machine or the bench just as much as it is to the beginner in the drawing office.

"With reference to the course itself, would say that so far it appears to have been very cleverly designed, and is just about the thing that is needed."

Never try to get in behind the excuse that you never had a chance when you were a boy. Do not rehash that yarn about having to leave school early and go to work. Thousands have had to do that, and from these thousands many have gone ahead in spite of conditions, rather than with their assistance. What others have done you can do. In fact the same words that appeared in this page last week can well be used again, "You can make yourself what you want to be."

A COMMA is a little thing, but so is a cinder in your eye. In the wrong place, little things can cause a great deal of trouble. A certain poor woman, whose husband was going to sea, handed through the clerk to the minister this notice, which she desired him to read in Hebrew: "A man going to sea, his wife desires the prayers of the congregation." The minister, punctuating it in his own way, read it thus—to the obvious amusement of his flock: "A man going to see his wife, desires the prayers of the congregation."

WIRELESS AT THE RATE OF 200 WORDS A MINUTE

Remarkable Developments Have Taken Place—
Messages Sent Over 12,000 Miles

AT a recent meeting of the Montreal branch of the Engineering Institute of Canada, a paper on "Recent Progress in Wireless Telegraphy" was the subject of the evening, and the speaker was J. O. G. Cann, chief engineer of the Marconi Wireless Company of Canada, in Montreal. During the address Mr. Cann spoke on the widespread use of wireless by the Germans and the enterprise of the British and other allies in the destruction of many stations in various parts of the world that had been utilized for enemy war purposes. Mr. Cann outlined the different systems now in use, describing briefly the operation of each, stating that the spark method of the Marconi Company was the one generally used throughout the world. Some conception of the efficiency of wireless may be gathered from the fact that signals from Carnarvon, in Wales, have been regularly copied at Sydney, Australia, a distance of 12,000 miles. Mr. Cann read two of these messages that had been transmitted during the period of the war.

Wonderful advancement has also been made in wireless telephony, and sets are now available which will permit of telephonic speech from one airship to another, or from the plane to the ground. Sets are also made for conversation between ship and ship. Mr. Cann also spoke on the progress of direction finding and the advantages that had been derived by its use in minimizing or eliminating many of the Zeppelin raids over France and England. This feature was also extensively used in locating enemy submarines and subsequently destroying them. Some idea of the progress of wireless may be had in the speed that is now possible in transmitting messages. The hand-sending method, with a speed of about 20 words per minute, is being replaced by apparatus with a capacity of over 100 words per minute, and special machines are now under construction, at Montreal, that will be capable of transmitting 200 words per minute. Signals from this new device will be transferred direct to the land circuit and from there taken off on a tape passing through a printing telegraph. Samples of these messages were on exhibit, and it is interesting to state that one of these was recorded when the operator was absent from the office. In addition to the address, Mr. Cann had with him some modern wireless equipment, and illustrated with a number of slides, some of the essential mechanism of a wireless station.

Men and Machines

A WELL-KNOWN Canadian firm, advertising its lines, uses the phrase, "If you can't get the men, get the machines."

There is something more than a mere catch phrase for selling in that statement. It tells an industrial necessity in a blunt and forceful way.

There are foundries filled with moulding machines to-day, partly because they refused to be strike-tied, and because the competition the firm had to meet called for production the most efficient way.

There are special purpose machines lined up in production departments all over the country to-day working on operations that a few years ago were considered as grist for a standard or general purpose machine.

The whole atmosphere of the mechanical world is changing. When our forefathers wanted nails they went to the blacksmith shop and the smithy hammered them out. To-day nails come out so rapidly that it keeps a man busy carting them away.

Likewise when in need of clothing they sheared the flock, and laboriously spun the wool to yarn to cloth. To-day ponderous and intricate textile machinery performs the same operations with so much more rapidity and precision that the old process seems unthinkable slow and cumbersome.

Not many years ago the compositor set type, one letter at a time. They used to attain what was reckoned as speed in those days, but to-day one operator fingering a keyboard, will readily produce five times as much type.

Such great strides have been made in the past that we, at times, may be inclined to think that mechanical progress belongs to the past. That's wrong. New machines are coming out now. There are more reasons than ever before. There is the element of absolute necessity. Firms must put in labor-saving machines or go down and out in the pace of active and unrelenting opposition. If they can't get the men they must get the machines.

French Names For Tools and Machines

THE Assistant to the Commissioner-General in Paris writes under date of October 10: When Canadian manufacturers are writing to customers in France it is well to use, so far as possible, the nomenclature current in the trade in France. Following are translations of the French names of some of the tools and machines in demand in France:—

Machines-outils.	Machine tools.
1. Alesours	Reamers.
2. Appareils de levage	Lifting machinery.
3. Boulons	Bolts.
4. Charnes de arrete	Safety chains.
5. Crevilles	Shearing machines.
6. Coussinet	Bearing.
7. Coussinet a billes	Ball bearings.
8. Coussinet de fructe	Cutter screw plates.
9. Crochet	Hooks.
10. Ecrans	Nuts.
11. Etaux limeurs	Shaping machines or shapers.
12. Filamine	(Screw plates) machine.
13. Forets	Drills.
14. Fraise	Milling cutter.
15. Fraiseuses	Milling machines.
16. Goupes	Cranks.
17. Machines a affuter les outils	Tool grinders.
18. Machine a fraiser	Milling machine.
19. Machine a mouler	Grinders.
20. Machine a mouler a meule	Emeri grinders.
21. Machine a outiller pour chaudiere	Refracting machine tool.
22. Machine a peindre	Painting machine.
23. Machine a rectifier	Planing machine.
24. Machine a rectifier a table	Planing machine.
25. Machine a rectifier	Planing machine.
26. Machines de toleries et chaudronneries	Boilermaking machinery.
27. Machines d'extraction	Excavating machines.
28. Mèches	Bits.
29. Mèches pour percer le bois	Auger bits.
30. Mèches	Bits.
31. Perceuses	Boring machines.
32. Poinconneuses	Punching machines.
33. Poinconneuses	Punching machines.
34. Raboteuses	Planing machines or planers.
35. Robinets	Valves.
35a. Scies a metaux	Metal saws.
36. Scies	Saws.
37. Scies	Saws.
38. Tarauds	Taps (making thread in nut).
39. Tarauds	Taps.
40. Tarauds	Taps.
41. Tours a fileter	Thread-cutting lathes.
42. Tours	Lathe.
43. Tours verticaux	Vertical lathes.
44. Tours	Lathe.
45. Tours	Lathe.

Canadian firms desiring to sell any of the above articles in France may write for information to the Commissioner-General for Canada in France, 17-19 Boulevard des Capucines, Paris, France.



MARKET DEVELOPMENTS



High Premiums Being Offered for Auto Sheets

Strike Conditions Still Exert a Very Marked Effect on the Markets
—Hard to Satisfy the Customer Who Wants to Secure a Quick
Delivery in the Tool Market

WHILE it is a fact that the larger producers of steel are adhering to their old prices, that does not speak for the jobbers and the premium mills. Sales that are made now in sheets, plates, etc., are on the merits and urgency of the case. It is reported that in some points where makers of automobile bodies are hard up for supplies they are offering premiums as high as \$30 per ton in excess of the regular price to secure the wanted metal.

Fortunately for the shipbuilding industry in this section a nice tonnage has arrived during the week. This was placed on the books some time ago, but it has been rolled in the strike zone since the strike was called. Some of the producers' books are becoming rather top-heavy with future business, and it would cause no surprise were some of them who do considerable booking in Can-

ada to announce that they are out of the market for the time, especially on bars and hoop steel. There are warehouses in this district that have not seen a shipment of sheet or plate for almost a month now, and their customers are not faring any better.

The market for machine tools remains satisfactory. There is a good volume of business passing, the only trouble being in looking after the man who wants an immediate delivery. His only recourse for the time being is in turning to the used machinery market.

Improvement is seen in the scrap metal market, there being increased prices offered for stove plate and No. 1 machinery scrap. The coming of Baldwin's Limited to Toronto will mean that there will be a large purchaser in that firm for scrap material, as they will operate their electric furnaces largely from scrap.

MONTREAL DEALERS HARD UP FOR SOME WAREHOUSE LINES

Special to CANADIAN MACHINERY.

MONTREAL, Nov. 20.—There is still considerable pressure required in obtaining shipments of steel commodities from the United States mills. Dealers here, so far, have not been pinched for supplies, but have experienced no little difficulty in securing certain lines from American producers. The lines most affected have been plates, tubes and sheets, the latter in particular being almost impossible to get, especially for stock. With the coal miners gradually going back to work and the steel mills slowly coming back to normal operation, dealers here anticipate an early resumption to regular business. Some of the steel producing centres in the States have experienced considerable difficulty in securing raw materials and operations have been interfered with, but late reports indicate a better condition. However, the situation is not yet one that would change the mind of a pessimist, but is, nevertheless, moving toward a satisfactory adjustment. Dealers here are watching the developments across the line, and while reluctant to meet the advances that have taken place on some lines, there is a possibility that advances on

some of the semi-finished materials will be found necessary. General trading continues normal in those lines when the warehouse can supply the material.

The inquiry for machine tools is still of an encouraging character, but the situation in the States prevents dealers from stating when delivery of tools can be made. Dealers of old material report a gradual improvement in steel requirements.

Coppers Down and Others Up

Apart from the strength that is noted in price quotations the market is relatively unchanged. A steady business is carried on in all of the metals, but is not of large volume. With the exception of coppers, which are easier, and spelter and aluminum, which are unchanged, the stronger tone of the American market has resulted in dealers here advancing prices. Lake copper at 24½ cents is lower by ¼ cent. Electro is down ½ cent at 24 cents. Castings has declined 1 cent to 23½ cents per lb. Tin is ½ cent higher at 58½ cents. Lead has advanced ¼ cent to 8 cents per lb. Antimony at 10½ cents shows an advance of ½ cent per lb.

Fair Movement in Tools

From the reports that are gathered from the dealers and the trade, it is apparent that a fairly active demand still prevails for all lines of machine tool equipment. Inquiry seems to prove that the requirements are of a general character, and although few large single sales are recorded, the aggregate business compares favorably with that of the past few months. The situation as regards the delivery of tools from American manufacturers shows little change, and the delayed receipt of machines from United States points continues to be a factor of present trading. Dealers are reporting a good business in used machinery, but intimate that the visible movement of munitions machinery is considerably less and the second-hand trading is showing an increasing decline in this direction. One large tool dealer here has been overhauling used tools for the past 8 months, and equipment purchased on this basis is virtually rebuilt before it is offered for resale, so that the buyer is assured of a first-class tool when a sale is made. It has been learned that the Belgian Government has an option on a large portion of American tools now in Canadian plants that are the property of the American Government.

Strength in Steel Scraps

While there is little of a feature character in the local scrap situation, there is, nevertheless, a slight improvement in some directions. Non-ferrous metals are steady, but not active, and the demand is normal, with promise of gradual betterment. Dealers state that a better tone is developing in the steel end, as the past week has seen heavier trading than for some time. On the whole, the market is still quiet, but the better in-

quiry denotes increased buying in the near future. American mills are again in the market and shipments from this district are again in evidence. Steel foundries and stove plants are fairly busy and strength is also noted in general foundry requirements. Machine shop turnings are now quoted at \$7.00, an advance of \$1 per ton. Stove plate has jumped from \$15.00 to \$21.00, the price now ruling. Cast iron borings at \$9.00 is an advance of \$2.00 per ton.

for the present at least. But of course that does not govern all the mills nor does it have much to do with the jobbers who are fortunate enough to secure a supply of material. Premiums on some of the material that may be had is based on the merits of the particular case as far as price is concerned. Reports from some points in the United States have it that automobile body makers are paying as high for the best quality of steel as for some of the agents for the large U. S. mills will have to go out of the market in certain lines, as their bookings are getting to be so far in advance that they become unsatisfactory and uncertain. The lines that will be affected by this move will probably be bars and hoop steel, for both of which there is a great demand and a correspondingly great scarcity.

Fortunately some of the shipbuilding concerns have a nice tonnage coming through at present, quite a lot of which arrived during the week. This business has been on the books for some weeks, but it has all been rolled since the strike has been on at the mills. They have received their material in good rotation, that is the keels have come along in good time in advance of the rest, so that work has not been retarded.

Warehouses in many departments are pretty well strapped of material. A shipment of sheets or plate would look wonderfully good to a number of such institutions. Their customers are also hard on as far as being able to secure anything, and time does not improve matters. The season has been exceptionally favorable for machine shop material for outside work, and transportation has also been the best. The regret expressed on many sides is that in the face of these favorable circumstances, there should be happenings of such a disappointing nature.

A Better Scrap Market

For the first time in some weeks local buyers in scrap metals are willing to pay better figures for some of the whites. Stove plate, for instance, has advances from \$13 to \$18 per ton, while No. 1 machinery scrap is up from \$18 to \$22 per ton. The reason is that there is an acute shortage. Grey iron foundries are leaving, and so are the makers of stoves and light sand castings. There is only a very limited supply coming in. This class of material comes mostly from the run of scrap heaps all over the country. The demand is just as keen in United States as here, and in many places more so. The demand is not unusual, especially at this season of the year. During the war nearly all the available material of this sort is gathered up and melted, and there has not been a very great deal of it coming into the market since.

Changes in freight rates and the same may be said of the brass sections. There is nothing coming across from the Old Country and nothing going out as freight rates are prohibitive.

There is considerable interest being taken in the coming of the well-known Welsh firm, Baldwin's, Limited, to the

SHIPMENTS OF STEEL BADLY NEEDED IN THIS DISTRICT NOW

TORONTO.—The fact that the coal strike has been called off in United States does not mean that there is going to be a good supply coming to this country. There are many firms who would like more definite information regarding their fuel stores, and it tends to create a little uncertainty in spots. The steel strike in United States, while it may be over in many of the plants, is still a very real thing in the country because supplies are still seriously interfered with and curtailment of operation is resulting.

The Machinery Market

If one had told you, at the close of the war, that the Canadian market for machine tools was good enough to absorb thousands of dollars' worth of business every week for an unlimited time, there might have been some doubt in accepting the statement. But that is what has happened and is happening. The reports from dealers are all the same. The business offering is good, and the only fly in the ointment at the present moment is trying to look after the chap who wants to get a quick delivery on his purchases. The only dealers who can look after this sort of business very successfully are those with stock or used tools, and the former—stock—is not a plentiful thing.

Machine tool firms are making a study of the selling problems as they have not done for some years back, and they are going to put a lot more steam into the business in certain lines. They aim to make their representatives in smaller centres real salesmen. Doing this will save a lot of running around on the part of men from the head office.

Some Shipments of Steel

Conditions do not improve in regard to the amount of plate and sheets entering Canada. Fortunately some of the industries have had their business on the books of the steel companies for some time back, and now shipments against these previous orders are starting to come through and they really stand the firms in good stead, as otherwise they would have to close their doors or curtail their output to a very large extent. The large steel companies, such as the Steel Corporation, stick to the price that was in force when the strike broke out, and they are not going to change that as \$30 per ton premium for auto ma-

terial. It is only a matter of time, if things keep up there as they have been

POINTS IN WEEK'S MARKETING NOTES

It is reported from some American points that automobile body makers are paying premiums as high as \$30 per ton in addition to the market price for sheet material.

Owing to the tremendous 1920 bookings some of the larger producers may shortly withdraw from the market. This refers especially to bars and hooping, which are hard to secure now.

The scrap metal market is showing more strength. There is an acute shortage of stove plate and No. 1 machinery scrap, and prices for these sorts strengthened several dollars per ton during the week.

It is now almost a month since some of the Toronto warehouses received a shipment of either plate or sheets. Some of the shipbuilding firms that had orders in some months ago received nice deliveries during the week.

The U. S. Ordnance Board is asking Canadian machine tool dealers for a refund of profits charged on duty on machines coming to Canada. In some cases the dealer's money has been tied up for as long as six months, so they consider they are entitled to charge their profit on the total selling price of the machine including the duty.

There is a brisk demand for machine tools, and selling is general—the only exception being that it is hard to satisfy the man who wants immediate delivery.

Baldwin's Ltd., purchasers of the British Forgings plant, intend to rush work on their finishing plant, and should secure production by July of next year. They will be in the market for large tonnages of scrap metal.

plant of British Forgings, where there is a very large capacity for electric steel production. For the present this plant will operate largely from scrap material, and so it is seen that they will

be very large buyers of this material. Work is being rushed on the finishing mill there now, and when production is secured there will be a large tonnage of scrap moved to that yard daily.

U.S. MAKERS OF MACHINE TOOLS SOLD AHEAD FOR SEVERAL MONTHS

Special to CANADIAN MACHINERY.

NEW YORK, Nov. 20.—One of the largest buyers of machine tools in the past week is the General Electric Co., Schenectady, N.Y., whose purchases have totalled about 100 machines. Another list calling for quotations on about 25 tools has also been issued by this company. Other companies which are buying or enquiring for equipment are the Worthington Pump and Machinery Corporation, N.Y.; the Bartlett Hayward Co., Baltimore, Md.; the Autocar Co., Ardmore, Pa.; the Lamb Knitting Machine Co., Chicopee Falls, Mass.; the National Scale Co., Chicopee Falls, Mass., and the American Locomotive Co., N.Y.

There is a slightly better demand for cranes, two large enquiries being in the market, one from the Bethlehem Steel Co., calling for bids on eleven cranes for its Lebanon, Pa., plant, and the other from the Sun Shipbuilding Co. asking for bids on five cranes for its shipyard at Chester, Pa., which will be enlarged by the addition of two ways.

The United States Shipping Board has cancelled a number of contracts with shipbuilding companies which took contracts during the war, and some of these companies are engaging in private work, with the result that a much improved demand for machine tools and plate-working machines from shipyards has developed. For more than a year build-

ers of equipment have been waiting for a settlement of claims aggregating \$650,000 against the Atlantic Corporation, Portsmouth, N.H., which built a shipyard at the behest of the Shipping Board during the war. No ships were constructed, however, because of differences which arose between the company and the Shipping Board relative to the contract. Now the Government has agreed to pay all claims, and the shipbuilding company will proceed on a new contract.

There is a good demand for second-hand tools because of delays in deliveries of new tools. The demand for new milling machines has been particularly good for some months, with the result that the milling machine manufacturers are well sold up. One large company will, however, soon increase its production to 500 milling machines a month and expects to be able to deliver machines from stock at all times. The country has absorbed a large amount of new machinery since the first of the year in addition to very large numbers of used tools from war plants. One large machine-tool concern had early in the year about \$1,500,000 worth of its machines in stock, but now this stock has been entirely exhausted, in addition to all the machines that have been made since that time.

scriptions of finished steel, and some buyers, particularly foreign buyers, find it almost impossible to make any purchases. The United States Steel Products Company, the export organization of the Steel Corporation, withdrew from the export market about a fortnight ago, and since then the Consolidated Steel Company, the company formed under the Webb Act and representing almost all the large independents, has likewise withdrawn from the export market. One of the large automobile makers is reported to have offered \$30 a ton premium for steel sheets for bodies. Sales of black sheets on the basis of \$4.50 to \$4.65 for 28 gauge, or \$2 to \$5 a ton premium, have been common. Bars, which are officially 2.35c have readily brought 2.50c and more.

Making a general survey of the situation, however, and counting up the tonnage sought to be bought in proportion to the tonnage being produced, there is no wide scarcity of steel products. It is rather a small scarcity, very acute where it exists at all. In other words, a close estimate can be made that from the date of the strike, September 22, to date, the production of finished rolled steel has been between 2,000,000 and 2,500,000 gross tons less than it would have been if the rate of production in the first three weeks of September had been continued, and there is no demand in the market for anything like such a tonnage of steel.

It does not follow by any means, however, that steel would have become a drug on the market if no strike had occurred. Jobbers and consumers had stocks, partly normal stocks and partly stocks built up in anticipation of a strike, for it must be understood that this strike, perhaps a much greater one than occurred, was expected, though nothing was said publicly about it beforehand by either manufacturers or consumers. Furthermore, the existence of the strike has caused many who would otherwise have been in the market to hold back, this applying particularly to those who had building projects. Finally, the strike occurred at the best time of year for producers and consumers in many lines. Thus the canning season was over and mill shipments of wire products for the usual fall distribution were ended. The pressure for deliveries of automobiles had begun to ease off, and the best time of the year for the inception of building operations had passed.

The strike, as a strike, will probably be practically over in two or three weeks, except possibly for the Wheeling district, but steel production will be restricted for a long time to come, through working forces being so disorganized. There will be after the strike, as there was before the strike, labor shortage, and there will be a desire on the part of the manufacturers to establish an eight-hour turn in place of the present twelve-hour turn, something that would require many more men if the entire mill and furnace capacity were to be operated.

With stocks exhausted all along the

AUTO MAKER OFFERS PREMIUM OF \$30 TON FOR BODY MATERIAL

Special to CANADIAN MACHINERY.

PITTSBURGH, Nov. 19.—Few union coal miners have returned to work since the officials of the United Mine Workers recalled their strike order under compulsion of the Federal court, but the steel industry is no longer seriously concerned since it is regarded as settled that enough coal will be mined to enable consumers to get along. There are stocks of coal of considerable magnitude, and there is heavy production at the non-union mines, this including the whole Connellsville district, which ships as much coal now as it makes into coke. Coal which the railroads have held instead of delivering it to consumers is likely to be released as occasion requires.

Steel Strike End in Sight

The virtual end of the steel strike is in sight. The strike is now in its ninth week, and in the past three weeks men have been returning to work more and more rapidly in all but one of the affected districts that remain, the excep-

tion being the Wheeling district, which remains tightly closed. Operations are increasing rapidly in the Mahoning valley, more than 50 per cent. of the blast furnace capacity being in operation, against about 90 per cent. just before the strike, while in Eastern Pennsylvania nearly as good a proportion. The Chicago-Gary district is rapidly approaching normal, while at Cleveland and Buffalo operations are increasing at a good rate. Western Pennsylvania has been practically free from strike for several weeks except in two spots, New Kensington and Monessen. The entire south has been running full throughout the strike, while in Eastern Pennsylvania the same is true with two or three trifling exceptions.

Supplies of Steel

Of course the steel market presents some appearance of there being a great shortage. Consumers are paying premiums for early deliveries of several de-

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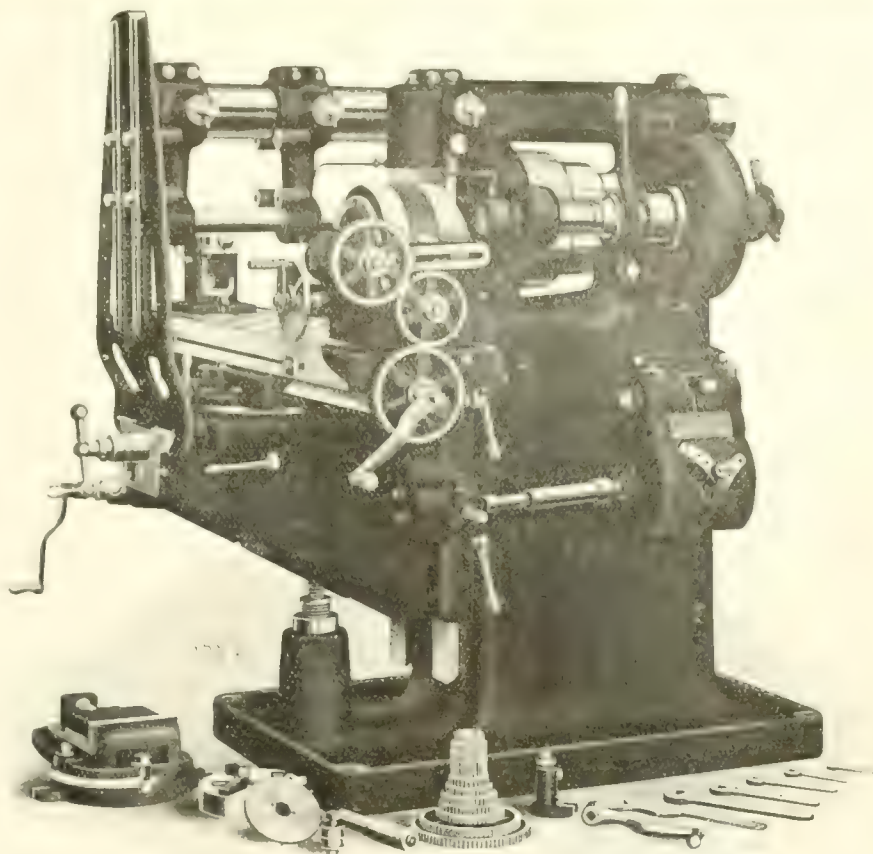
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line and with various activities requiring much more steel in spring than in winter, and with the railroads likely to enter the market after their long absence, there is bound to be a very heavy demand for steel, a demand greater than can be supplied. The lucky consumers are those who are recognized regular customers of those large mills that are adhering to the March 21 schedule of prices and are willing to book their customers for additional tonnages, for 1920, as shipments are made on their present contracts. The casual buyer, or the buyer who has been in the habit of shopping around among mills seeking the most favorable turns and buying now from one mill and now from another, has practically no chance in the market at present, and is not likely to have much chance for months to come.

Many of the smaller independent mills have advanced prices. This means in substance that they are charging delivery premiums, as long as there are other sellers who will take business from old customers at March 21 prices. To what extent the large independents will do the latter is not known, but what the Steel Corporation has done is shown in its unfilled tonnage statement for October, made public last week. This statement showed unfilled obligations at the end of October of 6,473,668 tons, representing an increase of 188,030 tons during October. As the Corporation's shipments in October were between 700,000 and 800,000 tons, probably close to the latter, its bookings in the month were nearly a million tons, and it is positively certain that none of this business was done at above the March 21 prices.

Except to an extent in Bessemer and basic iron there is no restraining influence in pig iron as there is in steel, and foundry pig iron continues to advance apace. A prominent merchant firm which buys and sells pig iron and also acts as agent, calls the valley market on foundry iron \$34 at furnace for silicon 1.75 to 2.25 per cent, and \$26 for silicon 2.25 to 2.75 per cent., with malleable at \$33. The \$34 compares with \$26.75 for the same kind of iron by the March 21 schedule. A prominent producing interest calls basic iron \$27.25, valley, and Bessemer \$28.50, but one would have to be a customer of long standing, no doubt, to be able to buy at such prices.

The prices for foundry and malleable quoted above are, it is true, for early deliveries, and thus they might be considered premium prices, for delivery, were it not that there are no sellers for extended delivery and it is difficult to call a price a premium price when it cannot be stated over what price it is a premium. It appears to be a case of team work among the furnaces, to get a prompt market established and then endeavor to sell for extended delivery at the same prices.

New York.—Practically every grade of scrap is in active demand, and prices are moving upward. Heaving melting is moving freely at \$16.50 to \$17 f.o.b. New York. Clean cast borings are at \$15 to \$16.

CANADIAN MACHINE TOOL MEN ASKED TO REFUND PROFIT ON DUTY

MACHINERY dealers in Canada are particularly interested in a move that is being made now by the U. S. Ordnance Department, in the asking for a rebate of profits paid on the duty of the machines imported from United States for carrying on U. S. contracts in this country. For instance, suppose a machine cost \$1,000 in United States, and the duty was 35 per cent. The dealers reckon the resale price of that outfit as \$1,350, and collect their profits in proportion. The claim of the Ordnance Department now is that there should have been profit charged on only the price of the machine, and that dealers should refund the profit they collected on the duty.

"From our standpoint," stated one dealer to **CANADIAN MACHINERY** this week, "the thing amounts to this. We have always looked upon our selling price as the price laid down to the buyer here. If he sent to United States for that machine it would cost him \$1,350. We admit there is a good talking point in it, but there are other considerations. If a buyer came in here and said to me, 'The duty on that machine is going to

be \$350, I will give you a cheque for that the day it is called for by the customs," we would be pleased to call his purchase \$1,000 and base our earnings on that. But there are many cases where we have our money tied up for six months, and we simply have to maintain our balance of profit, or else we could not stay in business. As far as we are concerned now the deals have all been closed up long ago. When United States contracts first came over here we were dealing directly with the Canadian contractors, but a short time after that the U. S. Ordnance Department notified us that in future dealings would be direct with them. As far as the dealers are concerned I do not see how they can do anything about it."

Asked if there would be much involved in the controversy, our informant stated that he believed the claim, were it allowed, would amount to a considerable sum, as practically all the machine tool dealers in Canada are affected by the claim now being put forward by the U. S. Ordnance Department.

CONFERENCE WEEK FOR C.F.M. PEOPLE

Two Gatherings Held, One of Them to Make Better Salesmen Out of Dealers

The Canadian Fairbanks-Morse Co. held a dealers' conference at the Bloor Street plant on the 18th and 19th, and on the 21st and 22nd a department managers' and salesmen's conference at the offices on Front Street. About 75 dealers were in attendance at the dealers' conference, the idea being to make more efficient salesmen out of the dealers. Mr. F. W. Evans, the Toronto manager, addressed the men, pointing out that the successful dealer to-day must not depend on the company sending salesmen from the head office to close sales in their districts. A dealer must aim to become a salesman, not only to locate the prospective buyer of an engine, but to show him what kind of an engine and what equipment he needed. By so doing, the men attached to the sales force of the head office would have greater time at their disposal to develop new territory. Another point made by Mr. Evans was that the one sure way to enable Canada to regain her strong financial position was by greater production in this country, by having more things to sell, and a strong appeal was made to the dealers along these lines.

Pittsburgh.—All grades of scrap have advanced sharply this week. Heavy melting has been sold at \$21.50, cast borings \$20, and machine shop turnings \$17 delivered. Iron axles have brought \$40 and cast iron car wheels \$25.

SARNIA PLANT MAKES A START

H. H. Robertson, Ltd., Turning Out Asbestos Protected Metals for Building Purposes

H. H. Robertson, Ltd., Sarnia, manufacturers of asbestos-protected metals for building purposes, are now operating their plant, the first of its kind in Canada. The building which they are occupying had to be remodelled in many respects to receive the necessary equipment. This process is one which renders absolutely weatherproof metal employed in the construction of practically any kind of factory or storage building. It has a wide use in the United States not only for manufacturing plants, mine buildings, elevators, power houses, etc., but has also been used satisfactorily on buildings in which fine architectural effect has been more or less of a factor. The management of the Sarnia plant intimates that the outlook for their product is exceptionally encouraging. A further development will be the manufacture of good roads material.

ERRATA

We stated in our Oct. 23rd issue that the Cincinnati Lathe and Tool Company of Oakley, Cincinnati, formerly made a 15-in. lathe. This was an error in the reading matter, for this company does not manufacture, nor never has manufactured a lathe of such size. They supply their machines in the following sizes: 16, 18, 20, 22, 24, 26 and 28 inch sizes, and in two foot lengths of bed from six to thirty feet long, either cone type, belt drive, or geared head for belt or motor drive.



Sharp Chasers Cut Clean Threads

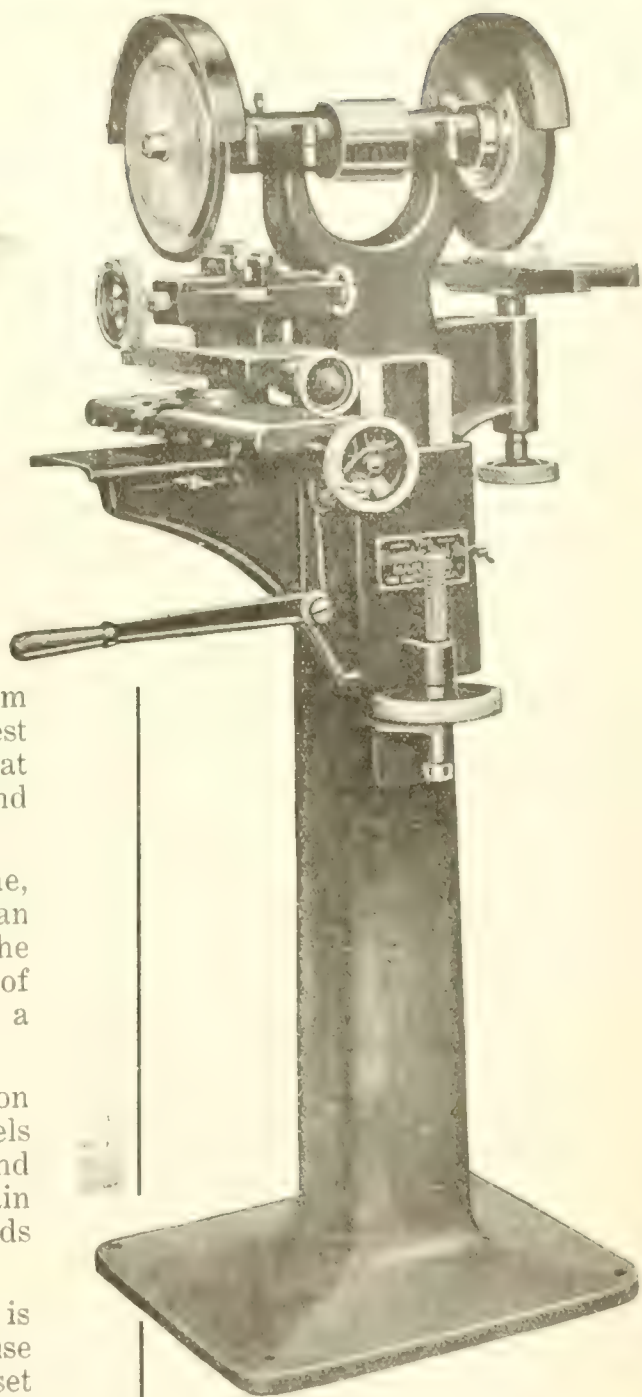
Accurate, uniform threads result only from dies which are maintained in the highest state of cutting efficiency. This means that chasers must be kept sharp, and ground uniformly.

Even if just touched up from time to time, the chasers respond splendidly, with clean threads. And with this machine — the Geometric Chaser Grinder—the matter of keeping threading tools up to scratch is a comparatively simple matter.

Various makes of chasers can be ground on this adaptable machine. The two wheels permit the easy grinding of both milled and tapped chasers. In addition, the plain wheel lends itself readily to various kinds of tool grinding.

Uniform grinding of a set of chasers is purely a mechanical matter through the use of adjustments which can be accurately set to govern the grinding of an entire set of chasers.

The Catalogue describing this machine is a mine of information on chaser grinding. Write for it



THE GEOMETRIC TOOL COMPANY
NEW HAVEN CONNECTICUT

Canadian Agents:

Williams & Wilson, Ltd., Montreal. The A. R. Williams Machinery Co., Toronto, Winnipeg, St. John, N.B.
Canadian Fairbanks-Morse Co., Ltd., Manitoba, Saskatchewan, Alberta

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	\$27 15
Lake Superior, charcoal, Chicago	34 60
Standard low phos., Philadelphia	\$38 00-40 00
Bessemer, Pittsburgh	29 35
Basic, Valley furnace	25 75
Toronto price:—	
Silicon .25% to 2.75% \$32.75 to \$35.75	

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	\$ 4 25
Steel bars, base, Toronto	4 25
Steel bars, 2 in. to 4 in. base...	5 50
Steel bars, 4 in. and larger base	6 00
Iron bars, base, Montreal	3 75
Steel bars, base, Montreal	3 75
Reinforcing bars, base	4 50
Steel hoops	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	4 40
Chequered floor plate, 3-16 in....	6 50
Chequered floor plate, ¼ in....	6 25
Staybolt iron	8 00
Bessemer rails, heavy, at mill....
Steel bars, Pittsburgh	2 35
Tank plates, Pittsburgh	2 65
Structural shapes, Pittsburgh....	2 45
Steel hoops, Pittsburgh	3 05
F.O.B., Toronto Warehouse	
Small sapes	4 25
F.O.B. Chicago Warehouse	
Steel bars	3 62
Structural shapes	3 72
Plates	3 90
Small shapes under 3"	3 62

FREIGHT RATES

Per 100 Pounds.
C.L. L.C.L.

Pittsburgh to Following Points		
Montreal	33	45
St. John, N.B.	41½	55
Halifax	49	64½
Toronto	27	39
Guelph	27	39
London	27	39
Windsor	27	39
Winnipeg	89½	135

METALS

	Gross.	
Lake copper	\$24 25	\$25 00
Electro copper	24 00	25 00
Castings, copper	23 50	25 00
Tin	58 50	58 00
Spelter	10 00	10 50
Lead	8 50	8 50
Antimony	10 50	10 50
Aluminum	33 00	35 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, ½ up	\$ 4 50	\$ 4 75
Plates, 3-16 in.	4 90	5 25

Price List No. 38

WROUGHT PIPES

Standard Butt weld

⅛ in.	\$ 6 00	\$ 8 00
¼ in.	4 68	6 81
⅜ in.	4 68	6 81
½ in.	6 21	7 78
¾ in.	7 82	9 95
1 in.	11 56	14 71
1¼ in.	15 64	19 90
1½ in.	18 70	23 76
2 in.	25 16	32 01
2½ in.	40 37	51 19
3 in.	52 79	66 94
3½ in.	67 16	84 18

	79 57	99 74
4 in.		
Standard Lap weld		
2 in.	38 81	35 34
2½ in.	42 12	52 36
3 in.	55 08	68 47
3½ in.	69 00	86 94
4 in.	81 75	103 00
4½ in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces

WROUGHT NIPPLES

4" and under, 60%.	
4½" and larger 50%.	
4" and under, running thread, 30%.	
Standard couplings, 4" and under, 40%.	
4½" and larger, 20%.	

OLD MATERIAL

Dealers' Average Buying Prices.

	Per 100 Pounds. Montreal	Toronto
Copper, light	\$15 00	\$13 75
Copper, crucible	18 00	18 00
Copper, heavy	18 00	18 00
Copper wire	18 00	18 00
No. 1 machine composition	16 50	16 75
New brass cuttings	13 00	10 75
Red brass cuttings....	14 50	14 75
Yellow brass turnings..	9 00	9 00
Light brass	7 50	7 00
Medium brass	9 00	7 75
Scrap zinc	6 00	6 00
Heavy lead	5 00	5 25
Tea lead	3 75	3 50
Aluminum	18 00	18 00
Heavy melting steel ...	13 50	13 50
Boiler plate	13 50	11 00
Axles (wrought iron)..	20 00	20 00
Rails (scrap)	14 50	13 50
Malleable scrap	15 00	17 00
No. 1 machine cast iron.	21 00	22 00
Pipe, wrought	10 00	5 00
Car wheels	20 00	20 00
Steel axles	20 00	20 00
Mach. shop turnings ...	6 00	7 00
Stove plate	18 00	21 00
Cast boring	7 00	9 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ⅝" and less.....	35
Carriage bolts, 7-16 and up.....	15
Coach and lag screws.....	50
Stove bolts	65
Wrought washers	50
Elevator bolts	25
Machine bolts, 7-16 and over.....	40
Machine bolts, ⅝" and less.....	40
Blank bolts	25
Bolt ends	25
Machine screws, fl. and rd. hd., steel	27½
Machine screws, o. and fl. hd., steel	10

Machine screws, fl. and rd. hd., brass	net
Machine screws, o. and fl. hd., brass	net
Nuts, square blank.....	add \$0 75
Nuts, square, tapped.....	add 1 00
Nuts, hex., blank.....	add 1 00
Nuts, hex., tapped	add 1 25
Copper rivets and burrs, list less	15
Burrs only, list plus.....	25
Iron rivets and burrs.....	40 and 5
Boiler rivets, base ¾" and larger	\$8 50
Structural rivets, as above.....	8 40
Wood screws, O. & R., bright.....	75
Wood screws, flat, bright.....	77½
Wood screws, flat, brass.....	55
Wood screws, O. & R., brass.....	55½
Wood screws, flat, bronze.....	50
Wood screws, O. & R., bronze....	47½

MILLED PRODUCTS

(Prices on unbroken packages)

	Per Cent.
Set screws	50
Sq. and Hex. Head Cap Screws...	45
Rd. and Fil. Head Cap Screws...	20
Flat But. Hd. Cap Screws.....	10
Fin. and Semi-fin. nuts up to 1 in.	45
Fin. and Semi-fin. nuts, over 1 in., up to 1½ in.	40
Fin. and Semi-fin. nuts over 1½ in., up to 2 in.	25
Studs	30
Taper pins	50
Coupling bolts	10
Planer head bolts, without fillet, list	10
Planer head bolts, with fillet, list plus 10 and	net
Planer head bolt nuts, same as finished nuts.....	
Planer bolt washers.....	net
Hollow set screws.....	net
Collar screws.....	list plus 20, 30
Thumb screws	40
Thumb nuts	75
Patch bolts	add 20
Cold pressed nuts to 1½ in....	add \$1 00
Cold pressed nuts over 1½ in....	add 2 00

BILLETS

	Per gross ton
Bessemer billets	\$38 50
Open-hearth billets	38 50
O.H. sheet bars	42 00
Forging billets	51 00
Wire rods	52 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	\$4 70
Cut nails	4 75
Miscellaneous wire nails	60%
Spikes, ⅝ in. and larger	\$7 50
Spikes, ¼ and 5-16 in.	8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian.....	0 44
Packing, No. 2 Italian.....	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, ¼-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net
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Secure Your Starrett Tools

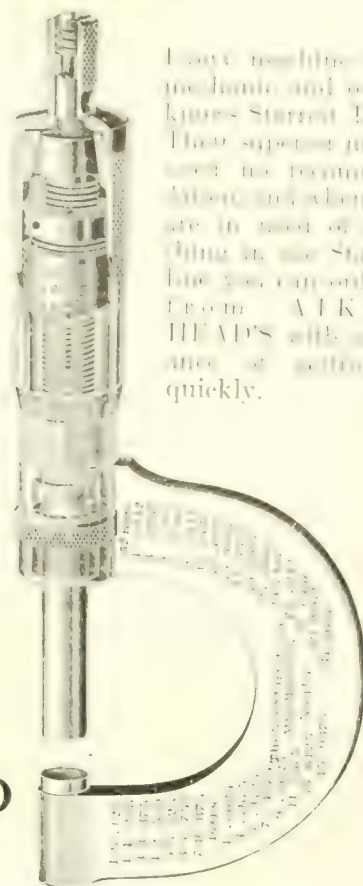
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Aikenhead's

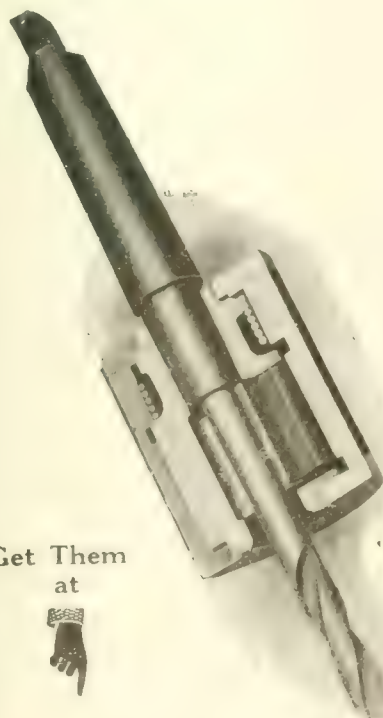
*Complete Line of These Tools
Always Carried in Stock*

For almost thirty years Starrett Tools have gauged the accuracy of the world's work. Micrometers, calipers, hack saws, tapes—whatever the tool, if it bears the Starrett trade mark, machinists recognized as standard.

AIKENHEAD HARDWARE, LIMITED
17 Temperance St., Toronto



These machines stop the hand and secure known Starrett Tools. Their superior pieces need no introduction. Also, and when you are in need of any thing in the Starrett line you can order it from AIKENHEAD'S with assurance of getting it quickly.



Get Them
at



WAHLSTROM Automatic Drill Chucks Save Time

You can remove the tool in a second without stopping the work. They are centred automatically. No slipping, no chewed-up shanks.

Your work often requires more spindles than your drill press possesses. The Wahlstrom Automatic enables you to drill any number of holes of various diameters, regardless of the number of spindles in your drill press, at a MINIMUM cost.

As we carry a full line of Wahlstrom Chucks in stock we are able to meet your requirements at a moment's notice. Remember AIKENHEAD'S when you need a Wahlstrom.

Aikenhead's

AIKENHEAD HARDWARE, LIMITED
17 Temperance St., Toronto

MISCELLANEOUS

Solder, strictly	\$ 0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50

Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 50
Linseed oil, raw, single bbls.	2 90
Linseed oil, boiled, single bbls.	2 92
Plaster Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	List plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	50
Standard drills, all sizes	50
3-fluted drills, plus	10
Jobbers' and letter sizes	50
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	50
Sleeves	50
Taper pin reamers	net
Drills and countersinks	list plus 10
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus 10 to 40	
Canadian high speed cutters	net
American	plus 40

COLD ROLLED SHAFTING

At mill	list plus 5%
At warehouse	list plus 25%
Discounts off new list. Warehouse price	

at Montreal and Toronto

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15½c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.	
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SHEETS

	Montreal	Toronto
Sheets, black, No. 28	\$ 6 55	\$ 6 75
Sheets, black, No. 10	5 15	5 65
Canada plates, dull, 52 sheets	8 50	7 10
Can. plates, all bright	8 50	8 00
Apollo brand, 10% oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbal's Best, No. 28		
Colborne Crown, No. 28		
Premier, No. 28 U.S.	8 20	
Premier, 10% oz.	8 50	
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

(Warehouse Price)

B

¼ in., \$13.00; 5-16, \$11.00; ¾ in.,

\$10.00; 7-16 in., \$9.80; ¾ in., \$9.75; ¾ in., \$9.20; ¾ in., \$9.30; ¾ in., \$9.50; 1 in., \$9.10; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

ELECTRIC WELD COIL CHAIN B.B.

¾ in., \$16.75; 3-16 in., \$15.40; ¾ in., \$13.00; 5-16 in., \$11.00; ¾ in., \$10.00; 7-16 in., \$9.80; ¾ in., \$9.75; ¾ in., \$9.50; ¾ in., \$9.30.

Prices per 100 lbs.

FILES AND RASPS

	Per Cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	27½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50
Great Western-American	50
Kearney & Foot. Arcade	50

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	\$27 00	\$.....
1¼ in.	29 00
1½ in.	29 50	26 00
1¾ in.	32 00	26 00
2 in.	31 00	26 00
2¼ in.	35 00	28 00
2½ in.	43 00	32 00
3 in.	48 00	40 00
3½ in.	41 00
3¾ in.	60 00	42 00
4 in.	75 00	56 00

Prices per 100 ft., Montreal and Toronto

OILS AND COMPOUNDS.

Castor oil, per lb.
Royalite, per gal., bulk	22½
Palacine	25½
Machine oil, per gal.	36
Black oil, per gal.	16
Cylinder oil, Capital	62
Cylinder oil, Acme	45
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	\$2 60
Union thread cutting oil, antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	8

BELTING—No. 1 OAK TANNED

Extra heavy, single and double	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES

Polishing wheels, felt	4 00
Polishing wheels, bull-neck	2 25
Emery in kegs, American	06
Pumice, ground	06
Emery glue	35
Tripoli composition	09
Crocus composition	12
Emery composition	10
Rouge, silver	50
Rouge, powder, nickel	45

Prices per lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.6

BRASS—Warehouse Price

Brass rods, base ½ in. to 1 in. rod 0 34

Brass sheets, 24 gauge and heavier, base	\$0 42
Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

XXX Extra	19½	Atlas	17
Peerless	19	X Empire	15½
Grand	18	Ideal	16
Superior	18	X Press	14
X L C R	17		

Colored

Lion	15	Popular	12
Standard	13½	Keen	10½
No. 1	13½		

Wool Packing

Arrow	25	Anchor	15
Axle	20		11

Washed Wipers

Select White	11	Dark colored	09
Mixed colored	10		

This list subject to trade discount for quantity.

RUBBER BELTING

Standard ... 10% Best grades... 15%

ANODES

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices per lb.

COPPER PRODUCTS

	Montreal	Toronto
Bars, ½ to 2 in.	\$42 50	\$43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6x4 base	45 00	44 00

LEAD SHEETS

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$10 75	\$11 50
Sheets, 3½ lbs. sq. ft.	10 50	11 00
Sheets, 4 to 6 lbs. sq. ft.	10 25	10 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

PLATING CHEMICALS

Acid, boracic	\$.25
Acid, hydrochloric	.04
Acid, nitric	.10
Acid, sulphuric	.04
Ammonia, aqua	.13
Ammonium, carbonate	.20
Ammonium, chloride	.22
Ammonium hydrosulphuret	.50
Ammonium sulphate	.30
Arsenic, white	.14
Copper, carbonate, annhy.	.41
Copper, sulphate	.16
Cobalt, sulphate	.20
Iron perchloride	.62
Lead acetate	.30
Nickel ammonium sulphate	.16
Nickel carbonate	.32
Nickel sulphate	.18½
Potassium carbonate	.50
Potassium sulphide (substitute)	.42
Silver chloride (per oz.)	1.25
Silver nitrate (per oz.)	1.20
Sodium bisulphate	.18
Sodium carbonate crystals	.06
Sodium cyanide, 127-130%	.38
Sodium hyposulphite per 100 lbs	8.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.30
Zinc sulphate	.08

Prices per lb. unless otherwise stated

Announcement of Special Interest

to users of

Drop Forgings

THE Dominion Forge & Stamping Company have sold their two Stamping Plants.

This means that the entire resources and energies of the Company will be devoted to the Drop Forge Industry.

Extensive additions are being made to their Forge Plant to take care of the increasing demand for drop forgings in Canada.

This Plant is one of the largest and best equipped drop forge plants on the continent; and to maintain this position in the industry the company decided on this policy of concentration.

Forgings are made to customer's blue prints and specifications. Inquiries are solicited.

Dominion Forge & Stamping Co., Ltd.

Walkerville, Ontario

Toronto Office: 206 Excelsior Life Bldg.

Rushing Work on Baldwin's Finishing Mill

British Forgings Plant to be Greatly Enlarged—Expect to Operate Furnaces From Scrap Material—Operation Should be Secured at Toronto Plant by July of Next Year

TORONTO is in a fair way to take its first step toward becoming a centre of basic industries—or to be more correct, the step is being taken for her by Baldwin's, Limited, the Welsh tin plate manufacturers. Already progress is being made on the finishing plant that is being added to the British Forgings, and if present progress is maintained production should be secured by the middle of 1920. The new finishing shop, it may be mentioned, is 800 feet long by 70 feet across, and in this will be housed the rolling mills which will turn out the product that has heretofore been supplied from Wales, as far as the Baldwin business was concerned.

Speaking to a representative of CANADIAN MACHINERY this week, Mr. J. C. Davies, managing director of the company, stated that in coming to Canada, and locating in Toronto, he believed a business was being established that would have a great influence on the manufacturing industries in this community. "We want the support and the co-operation of the people of Toronto and the whole district. We are willing to establish here one of the heavy or basic industries, one that will turn out a large tonnage of material that is now imported. The securing of power is one of the chief items in our arrangements. We have not yet secured the arrangement we want, but there is not a great deal between ourselves and the Hydro Commission."

Something of the Plant

It might be well to mention here that the Baldwin plant has a capacity that will take care of 22,000 h.p. There are ten six-ton electric furnaces of the Heroult type. It is, as far as we know, the largest electric furnace installation of that type in the world, although there is one in course of erection in Norway or Sweden of equal, if not greater, capacity. The power comes to the plant at 13,200 volts, and for the purpose of carrying this line a duct run was laid across the city from Strachan avenue to Cherry, after which the line is overhead. Around the premises there are seven miles of standard gauge railway track. Shortly after the signing of the armistice the forge shop was destroyed by fire. For a time there was a fear in engineering circles that the plant was going to be dismantled. Mr. Russell, who had been representing the Baldwin interests in Canada for some time before, interested the principals of the concern to such an extent that in April some of them, including Mr. Davies, visited this country, with the result that after seeing the possibilities of trade in this country, and the capacity to which

the plant could be developed, Mr. Davies opened negotiations, which have since resulted in the acquiring of the property.

No Blast Furnace Yet

The report has been published in some papers that Baldwin's, Limited, intend to work from the ore, which means the installation of blast furnaces and perhaps a coking plant. When asked regarding this, Mr. Davies said, "For the present we intend to operate the furnaces, depending largely on scrap metal, for the turning of which into steel ingots the works are admirably fitted. We will be purchasers of very large tonnages of scrap material, much of which I am given to understand goes out of the country at present. Our decision regarding the installation of furnaces later on to produce our own iron from the ore will depend on the development of the business and the conditions of the market. We believe that the operation of our plant here will be a good thing for numerous other industries, for there are many lines affected by the operation of a plant that is turning out tin plate, and our other lines. Above all else for the present, though, we want to secure the co-operation and good-will of the Canadian people. We want that more than anything. We are taking a big step in coming to Canada, for many of our friends urged us to keep on supplying the trade here from our Swansea plant in Wales. We have taken the big step and we certainly are not going to turn back now."

Production by July, 1920

"What will be the first lines you will turn out?" asked CANADIAN MACHINERY.

"We expect to put the finishing mill in operation, and then all lines can be turned out. Of course there is a great forging capacity at the works, as you know, that was utilized to such good advantage in war work. We shall likely use that to turn out some of the heavy castings for our rolling mill. Some of the rest of it we shall secure in United States and some will come from the Old Country. As far as we can see there should be easily a market now for 200,000 tons annually of tin plate, black sheets and black plate (black plate for enamel work), galvanized sheets, etc. We also intend to develop the forging plant."

Mr. Davies is returning to the Old Country shortly, expecting to sail on the 25th of this month. He is enthusiastic about the future of this country, providing good relations can be maintained between the employers and labor. It is worth noting, in this respect, that the Baldwin plant, which employed at Swansea some fourteen or fifteen thousand hands, had no strikes during the war nor since, and good relations are maintained between the company and its men. It will be necessary for the Baldwin organization to bring to this country a number of skilled workmen, including those who will be in executive capacities. Their processes and methods must of necessity be followed very closely from the start if the best results are to be secured.

Roger Miller & Sons are putting in the foundation work for the finishing plant, and are making rapid progress. "If things keep moving as they are at present," said Mr. Davies in conclusion, "we should have production in several lines by July of next year."

SUCCESSFUL INDUSTRIAL CONCERNS GREW FROM SMALL BEGINNINGS

KITCHENER at the present time is hard put to it to accommodate the workmen who are flocking thither for employment in the city's factories or on construction work of the various plants now in process of erection. About one hundred and fifty houses have been built during the past season, and the Dominion Tire Co., by next spring, will have completed the erection of 300 houses for their employees. The manufacturers hope gradually to have the problem well in hand.

It is fairly well known that many of the large concerns now thriving in Kitchener had very modest beginnings. Discussing the unrest that is apparent among workmen, and the persistent feeling that there should be some more generous division of profits, Mr. J. P.

Scully, secretary of the Manufacturers' Association, Kitchener, said to CANADIAN MACHINERY: "When possible, and reasonable and advisable there will certainly be such a division, but it is the privilege of every man to do just as many of our manufacturers did. The country is still young. The opportunity is there. Why not start in a small way and develop with the country? Let us look at some of our concerns. Here is one man who started in by making one or two articles at a time. Had no capital to speak of and had to sell as he went along in order to get the wherewithal to make a few more. To day it's a large concern. There's another man who used to work for \$1.75 a day on the railroad. To-day by hard work he is the head of a big industry. Another man and



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IN THE "HUDSON" PLANT

Many of the foremost manufacturing concerns of the country have learned that differentiating between Milling and "Briggs" Milling is a profitable departure. They've found that over a wide range of application "Briggs" means better work and more of it, greater economy and larger service. In the Hudson Motor Car Co.'s plant, Detroit, Mich., "Briggs" Millers are making a particularly fine showing, being used exclusively on many operations requiring the closest limitations. It'll pay you to investigate "Briggs" possibilities on your work.

Several of these machines in stock at Toronto

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32 Front Street West, Toronto, Canada

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TORONTO

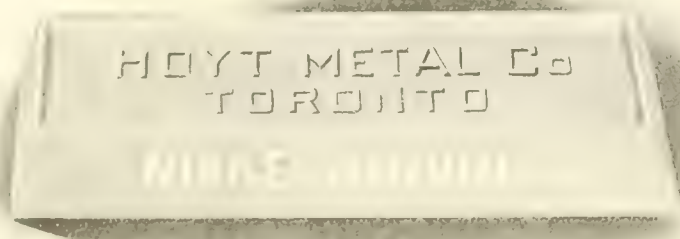
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who can use it, and
both of you will
make money.

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MONTREAL TORONTO OTTAWA WINNIPEG

Manufacturers

Blue and Black Print Papers
Drawing Office Supplies for Students,
Architects and Engineers.

If interested tear out this page and place with letters to be answered.

his five sons took as no man ever did to develop a struggling industry. Dad and the boys stuck together—an unusual thing. To-day nobody will say they are not entitled to the fruits of success.

Still Another Example

"One of the largest and most successful shirt and collar concerns on this continent is located here and had a very small beginning. These things were not achieved by any six or eight-hour day process—not by "sudden flight, but by toil-

ing upward in the night." And it is a fact that all of these men did toil upward both day and night. And the head of many a concern to-day is working and worrying for the welfare of his employees while the latter are sleeping."

The Kitchener citizen pointed out, however, that it is believed that in no other city in Canada was there a more sincere desire to give the workingman a square deal. Up to a short time ago, when certain trouble makers appeared

on the scene, no employee seemed to find it necessary to ask for better wages or conditions—all were satisfied. When any subsequent protest had been made it had been given fair consideration. "But the point we have to remember," said he, "is, that if Canada does not produce as she should, other countries will do so, the market will be supplied and Canadian industry will have fallen short. I believe as others do, that the Canadian future will be sure of big business."

The Week's Events in Montreal Industry

J. H. Larnes, who, for the past three years has been on the production staff of *Isarting Bros.*, Montreal, has been appointed purchasing agent for the company.

The American Smelting and Refining Company of Cincinnati, Ohio, are in the market to purchase large quantities of old materials, especially non-ferrous metals.

The Standard Equipment and Tool Works, 179 St. James St., Montreal, are in the market for a good universal milling machine, equivalent to No. 1 or No. 2; also a planer, shaper, and a bolt cutter.

The large dam recently constructed on the St. Maurice River will henceforth be known as the Gouin Dam. This enterprise is the largest of its kind in the world, and is capable of developing millions of hydro-electric horsepower.

Several large steel castings, weighing from 30 to 50 tons each, are being made at the Longue Point plant of the Canadian Steel Foundries for a 2,000-ton hydraulic press that will be erected at the Turcot works of the company for heavy flanging and bending in connection with their car construction.

An aftermath of the war was recently given to the residents of Quebec, when three scows laden with Lee-Enfield rifle cartridges were towed into the middle of the River St. Lawrence by order of the military authorities, and dumped into the water. The ammunition formed a large portion of the high surplus stock on hand, and for which there has been little need now that the range practice is discontinued.

J. R. Binning has been appointed manager of the Furness-Withy Company for Canada and Newfoundland. The appointment was made by Sir Frederick Lewis, Bart., the chairman of the company, during his recent visit to Canada. Mr. Binning has been with the shipping company since 1898, when he resigned from his position in the foreign freight department of the C.P.R. to join the Furness-Withy Company as assistant manager in Montreal, being appointed

manager in 1903. Mr. Binning has been active in marine circles for many years and has been identified with the work of the Shipping Federation of Canada since its inception.

The Canadian Railway Board has announced an agreement that provides for wage increases and certain changes in working conditions for approximately 35,000 Canadian railway shopmen. Negotiations to this end have been carried on for the past six months, and the wage increases will be retroactive to May 1 last. Changes pertaining to regulation of working conditions will come into effect on December 1. The agreement was signed on behalf of the board by the chairman of its administration committee, Mr. Grant Hall, and for the employees by Messrs. R. J. Tallon, Frank McKenna, and Chas. Dickie, president, vice-president and secretary respectively, of the labor organization.

Continual development in the Canadian pulp and paper industry has been a feature of the past few years, and now we have the announcement that Price Bros. & Co. anticipate extensive expansion to their present activities. This firm has definitely decided to commence operations on a large newsprint mill in the Saguenay district, which, when completed, will have a capacity of over 400 tons per day. Additional equipment has already been installed at the Kenogami mill, so that the present output of Price Bros.' mills has been raised to 325 tons per day, of paper and board. When the new plant is operating, the capacity of the three mills will be about 800 tons per day. The advent of the new mill will mean a new town site, and it will bear the name of "Saguenay."

There is every reason to believe that Canada will participate, in a large measure, in the reconstruction work that will be carried out in Belgium. Senator Beaubien, director of the Canadian Car and Foundry Company, who has been in Belgium for some time past, negotiating with the Government there for the relief of transportation difficulties, expects favorable consideration of the project. Hon. Philippe Paradis, president of the Asbestos Manufacturing Company of Montreal, has also been in conference

with Belgian and French officials, with the purpose of obtaining further contracts for cement products for use in reconstruction. Many other Canadian firms anticipate extensive trade development with Belgium. It is not unlikely that Belgian interests may establish a linen-weaving industry in Canada.

The plant of the National Electro Products Ltd., on Moreau Street, Montreal, is just about completed, and it is expected that active operations will be started before the New Year. In addition to the reconstruction of the plant that was acquired from the Beaver Engineering Company, a new building has been erected on the adjoining property that will give a total factory area of 106 by 100 feet, and situated directly opposite the C.N.R. freight sheds, which offers excellent shipping facilities for their product. Generating equipment has been installed for a capacity production of 60,000 cu. ft. of electrolytic oxygen per day. It has been learned that the company intend to establish a chain of factories from coast to coast; the Toronto plant is now in operation and the third factory will be erected in Hamilton. W. J. Cluff, of Toronto, is president of the company.

U.S. SCRAP METAL

Scrap prices are firmer all round. From all districts reports of better conditions are received. Following are some of the principal U. S. district reports:

Philadelphia.—There is a good demand for scrap, and purchasers cannot fill all their requirements. Borings and turnings are now being taken at the rate of 90,000 tons monthly. Rerolling rails sold at \$28, and 1,006 tons of axles for export at \$32 New York.

Boston.—Cast scrap stocks are being heavily drawn upon, and big advances are expected very shortly. Borings are very scarce, and some small lots have changed hands at \$21 delivered. Heavy melting sold at \$20.50 delivered.

Cincinnati.—With an improvement in the car situation, dealers have been able to ship material out, and all prices have advanced. All grades are in good demand, and conditions look better than for some time past.

TRADE GOSSIP

Making Changes.—Since November 1, shipments made by Acme Stamping and Tool Works, Ltd., Allith Mfg. Co., and Safety Door Hanger Co., are being invoiced by Slater and Barnard Limited, who own and operate these three companies. All purchases made by any of these three companies will also be changed to Slater & Barnard Ltd.

Quebec.—It is stated that the Davey Shipbuilding Company, Lauzon, has obtained contracts for a number of vessels, which will keep the yard busy for some months to come. The National Shipbuilding Company, a newly formed concern, has taken over some old yards at Levis, and will commence on the construction of a number of vessels for which they have secured contracts.

Need for Care.—If Canadian factories are going to be kept running all winter, the utmost care in the consumption of steam coal will be necessary. Production in the United States is far from normal, and will likely remain so for some time. The amount of bituminous coal brought into Canada from April 1 to Oct. 31 was only 70 per cent. of the amount received in the same period last year, and none has been shipped in since November 1.

Engineers Wish to Close Ranks.—The Provincial Executive of the New Brunswick Association of Professional Engineers at a recent meeting held a discussion on the subject of the making engineering a closed profession. A bill will be presented to the Legislature at the next session, which will seek to prevent any civil, mechanical, electrical, mining or any engineer practising his profession in New Brunswick until he had established his qualifications and been registered according to the Act.

Yarmouth.—There have been two launches recently in this district, both of schooners. One was at Belliveau's Cove, where the three-masted schooner Rosanne Belliveau was launched, fully rigged and ready for sea. The second was at Meteghan River, where the Doucett Shipbuilding Company launched the tern schooner Celeste D. This latter vessel is fitted with a 15 h.p. Fairbanks-Morse oil engine for hoisting purposes. This can be applied to the hoisting of sails and anchors, and if necessary connected with the pumps.

British Firms First.—The Secretary of State for India made a statement recently on the subject of locomotives for the Indian Government. A scheme had been proposed by the Armstrong-Whitworth Co. whereby that firm would establish an Indian company for the purpose of manufacturing locomotives. The Indian Government in turn would engage to buy from the new firm one-third of the English boilers it requires. A counter proposition will be considered from the Locomotive Manufacturers' Association. No invitation has been sent to American firms to compete.



SALE OF MILITARY STORES, ETC.

**DRY GOODS, HOSPITAL FURNITURE,
BEDDING, HARDWARE, LEATHER
GOODS, JUNK, ETC.**

SALES WILL BE MADE BY SEALED TENDER

Persons desiring to tender are requested to register their names and addresses with the

**SECRETARY OF THE WAR PURCHASING COMMISSION,
BOOTH BUILDING, OTTAWA**

stating the class of goods in which they are interested, whether new or second-hand or both.

Tender forms with full details of the goods and places at which samples may be seen, will be mailed when ready to those who have registered as requested above.

Special Terms to Hospitals, Etc.

Dominion, Provincial, and Municipal departments, hospitals, charitable, philanthropic, and similar institutions which are conducted for the benefit of the public and not for profit may purchase goods without tender at prices established by the War Purchasing Commission.

Returned Soldiers and Sailors and Widows and Dependents of Soldiers and Sailors killed in the War may obtain supplies, for their own personal use and not for re-sale, through the nearest branch of the Great War Veterans' Association who will combine individual orders and forward to the War Purchasing Commission through the Dominion Command of the Great War Veterans' Association. These services are rendered by the Great War Veterans' Association to all parties in the classes named, whether members of the Great War Veterans' Association or not.

All communications should be addressed to the Secretary, War Purchasing Commission, Booth Building, Ottawa, who will be glad to supply lists and further details to those interested.

Ross Rifle Claim.—The Exchequer Court is to adjudicate upon the claim of Sir Charles Ross for compensation for the compulsory taking by the Government of the Ross rifle factory in 1916. Subsequent to the expropriation Sir Charles filed a claim for about \$18,000,000 compensation and damages for cancellation of contracts. The Government refused the necessary fiat on the ground that in the order of expropriation the maximum value of the property was fixed at \$3,000,000. On the latter basis the case now goes to the Exchequer Court to

determine the actual amount to be paid with three millions as the outside limit.

Sale of Military Stores.—The War Purchasing Commission, Ottawa, is announcing a sale of military stores, etc., dry goods, hospital, furniture, bedding, hardware, leather goods, junk, etc., and inviting tenders for the same. Those desiring to tender are requested to register their names and addresses with the secretary of the War Purchasing Commission, Booth Building, Ottawa, stating the class of goods in which they are interested, new or used. Returned soldiers

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HAWK VANADIUM" TOOL STEEL

*Remarkable in its glass
Hardness, Toughness and
Cutting Efficiency.*

Will give twice the cut
of a regular tool steel
at one grinding.

Order "Hawk Vanadium"
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STEEL

OF EVERY DESCRIPTION

SEND US YOUR ENQUIRIES.

and sailors and widows and dependents of soldiers and sailors may club together to obtain supplies for their own personal use by applying for particulars to the nearest branch of the G. W. V. A.

Trouble in Shipping.—The transportation department of the Canadian Manufacturers' Association is sending out the following circular: "Complaints recently received from manufacturers and shippers would indicate that the freight service on the L. C. L. shipments to points east of Montreal in Quebec and the Maritime Provinces is again falling down badly and we propose conducting a thorough investigation with a view to effecting an improvement. We shall be obliged, therefore, if you will advise



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What you will pay for a few ordinary drinking cups will meet the cost of the

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DRINKING CUPS ARE UNSANITARY but the "Puro" delivers clean, fresh water at a reduction of 15% to 35% in water bill.

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Canadian Agents:

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as early as convenient if you have experienced any annoyance in this respect; and, if so, furnish us with full particulars. The information desired should include the following data: date of shipment; description of goods; consignee; destination, and, if possible, the carriers' way bill of reference, which you should be able to obtain from the local freight agent.

Busier at the Soo.—During the past few days there has been a great improvement in the industrial outlook at Sault Ste. Marie. It was announced that sufficient orders for rails and structural steel had been received by the Algoma Steel Company, a subsidiary of the Lake Superior Corporation, to keep the mill going all winter, or for six months. Several good orders for rails have been received lately from Canadian railways, being part of the work of replacement and repair so long delayed by the war. On October 21 the structural mill, recently completed as an addition to the rail mill, commenced operations, making structural shapes up to 15 inches, where formerly six inches had been the limit in Canada. Since then orders have been coming in rapidly. The manufacture of alloy steel for the first time in Canada has also been begun, and it is expected that this product will find its main market among the automobile factories of Ontario.

Sydney, N.S.—That better consideration would be given to the question of employment of returned soldiers, was the assurance given by Steel and Coal Company officials to E. R. Roberts of the advisory board of the G. W. V. A., Ottawa, and Dan McDougall, vice-president of the provincial command yesterday. A meeting between the above-named officers and Mr. McCann of the Steel Company and A. W. McDonald, employment agent, was held, and Mr. McDougall met a representative of the coal company. The many problems affecting the re-employment of returned men were thoroughly discussed. The delegation from the "Vets" were given a most attentive hearing, and they received the assurance that the returned man would be given every assistance to re-establish himself at the company's works. Mr. Roberts and Mr. McDougall both expressed themselves as extremely well pleased over the interview, and the promised betterment of conditions for their comrades.

PERSONAL

Walter Lambert, A.M.I.N.A., naval architect and marine surveyor, of Montreal, is leaving for Europe early in December to re-establish business connections with Old Country shipping interests, returning early in February.

The death is announced in Toronto of Capt. James McMaugh, who sailed the Lakes for upwards of fifty years. The deceased passed away at the home of his daughter, Mrs. D. R. McKenzie, 1307 King Street W. He was born in Quebec 78 years ago, and went to sea early in life. He was a veteran of the Fenian raid.

A. C. McKenzie has been appointed Engineer Maintenance of Way on the C. P. R., with headquarters at Montreal, succeeding Mr. Frank Lee, transferred.

Do right and you will fear no man.

Don't write and you will fear no woman.

PIG IRON TRADE

The pig grade, basic, with iron ports from U. S. points:

Philadelphia.—The basic was sudden, the \$6 jump occurring during the week. One lot of 20,000 tons was sold at \$33. Foundry iron is also higher. No. 2X selling at \$35.50 Central Pennsylvania furnace.

Boston.—The scarcity of pig iron has turned New England fields. Prices are higher, and there is considerable resale iron coming into the market. Sales for the week were around 6,000 tons.

New York.—There is not much tonnage available for this year's shipment, and prices are advancing with each sale almost. Next year sales are being confined to steel-making grades. There is good export enquiry but not much available.

Pittsburgh.—After a period of inactivity basic is getting into the procession. Quotations are being made for this year delivery from \$27.70 to \$29. Bessemer has been sold at \$29.70 valley furnace. Foundries are buying the steel-making grades to replace foundry grades that are unavailable.

Buffalo.—Considerable tonnage on higher schedule anticipated some weeks ago has been sold this week. The prices are \$34 for No. 2 plain; \$35.25 for No. 2X and \$37 for No. 3X. These prices are being generally quoted now. Malleable sold during the week at \$1.

Cleveland.—Prompt iron is still very scarce and prices naturally high. Some Buffalo iron was sold at \$36.10 delivered Cleveland. There is an enquiry in the market for 15,000 to 20,000 tons foundry and malleable for the General Motor Corporation; 1,000 tons 1.75 to 2.25 silicon foundry for first quarter delivery was sold at \$31 to \$32 Ohio furnace.

Chicago.—There are a number of enquiries out for foundry and malleable, but most of the makers are out of the market. There is some spot iron available from outside centres which is taken up as soon as offered.

Cincinnati.—Southern producers have withdrawn from the market on foundry iron. Malleable is in demand, and some has been sold at \$34 valley furnace. There is little spot foundry iron to be got, and no iron is being offered for first half.

St. Louis.—First quarter iron is quoted at \$30. Spot iron for Southern iron 1.75 to 2.25 silicon content. Foundries have enough business to keep them going for the remainder of the year.

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"One of the best things I have seen for some time," is the way one might describe the book issued by the Pangborn Corporation of Hagerstown, Md., descriptive of the works and the men behind the organization. In an introductory chapter is explained the manner in which Thomas W. Pangborn, fifteen years ago a beginner for foundry supplies, perfected his machines for sand-blasting and successfully put them on the market. Subsequent pages show views of the plant and offices, and numerous products turned out at the plant, as well as a list of the numerous installations at various plants.

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BY WELL-KNOWN BRITISH MANUFACTURER, young unmarried man to act as sales representative. Must be keen, aggressive, steady business getter, resourceful and absolutely reliable. To such a man a good future will open up. The line is high grade textile belting, paper makers' felts and linen fire hose, and a stock will be carried. Box 638, Canadian Machinery. (c24m)

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POSITION WANTED BY A FIRST-CLASS mechanic with a large experience in making gauges, dies, jigs and fixtures for small work, and small tools; can take charge of department. Know how to handle screws; have been working in some of the best shops in the U.S. Is an inventor, also improver and designer. Aged 50 years; good health; steady worker. In answering please mention the class of work and mention the highest wages, with all particulars. A position wanted for his son, also a first-class mechanic. Apply during the week of November 15th. L.E.J., 38 Glenelg Street W., Lindsay, Ont. (c26m)

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WANTED — SECOND-HAND ALLIGATOR Shear for cutting steel bars in good condition. Send particulars to Dillon Crucible Alloys, Limited, Welland. (c21m)

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FOR SALE—BRAND NEW INGERSOLL-RAND After-cooler, never used, for compressor up to 14 x 14". London Mfg. & Machine Co., Ltd., London, Ont. (ctfm)

ONE 23-FOOT GAP LATHE, 30" OVERSHEARS. One 20" Back Geared Drill. Apply The Vulcan Co., Ltd., London, Ont. (c22m)

AGENCIES WANTED

WANTED—AGENCY OF SPECIALTIES FOR hardware trade, factories, and mills, for Quebec City and district. Best connections and references. Reply to G. A. Vandry, 28 St. Joseph St., Quebec. (c21m)

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MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

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BRANTFORD PATTERN WORKS ARE PRE- pared to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell Phone 631; Machine Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (ctfm)

Mining Machinery for Sale

Alley & McLellan Air Compressor 600 ft. at 100 lbs. pressure, 125 H.P. Motor, heavy duty 600 R.P.M. 2 phase 60 cycle 550 volts.
Ingersoll-Rand 800 ft. Air Compressor. 1 Tube Mill Fraser & Chalmers 5 x 22. 1 Power & Mining 5 x 22.
Also large assortment of Pumps, Tanks, Classifiers, Boilers and Mining Equipment for sale.

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The "want ad." has grown from a little used force in business life into one of the great necessities of the present day.

Business men nowadays turn to the "want ad." as a matter of course for a hundred small services.

The "want ad." gets work for workers and workers for work.

It gets clerks for employers and finds employers for clerks. It brings together buyer and seller, and enables them to do business though they may be thousands of miles apart.

The "want ad." is the great force in the small affairs and incidents of daily life.

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Keep yourself in the public mind by advertising. It is just as important to make old friends remember as it is to win new friends. Advertising does both.

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If you are interested in buying a patent for the latest labor-saving device in mitre boxes, address Box 636, Canadian Machinery. (c22m)

Full line of

Honestly Rebuilt Machine Tools at bargain prices.

Special price on 20 inch x 8 ft. C.M.C. Lathe.

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the following used Equipment

**Draw-Bench
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OVER \$225,000 SPECIAL OFFERING!!!

NEW MACHINES

Attractive Prices

Prompt Delivery from our Jersey City Warehouse

- 2—20" x 12' American Tool Works Engine Lathes, quick change, motor drive.
- 20—20" x 8' Walcott Engine Lathes, double back geared, quick change.
- 2—14" x 8' American Tool Works Engine Lathes, geared head, motor drive, taper attachment.
- 35—Rahn Larmon Co. make, Engine Lathes, 16" x 8', quick change, double back geared, friction head.
- 30—16" x 6' American Tool Works Engine Lathes, quick change.
- 6—17" x 10' LeBlond Engine Lathes, heavy duty, double friction geared, quick change, taper attachment.
- 42—16" x 6' Cleveland Engine Lathes, 5 with pan beds and taper attachment.
- 2—12" x 5' Reed Prentice Engine Lathes, quick change.
- 25—Bardons & Oliver No. 4½ Ontario Screw Machines, friction geared head, with regular equipment.
- 2—No. 2 Becker Vertical Milling Machines with rotary attachments.
- 3—No. 3 Becker Vertical Milling Machines with rotary attachments.
- 1—No. 2 LeBlond Universal Milling Machine, single pulley drive.
- 19—Garvin No. 13 Back Geared Plain Milling Machines.
- 2—Rockford 14" Shapers, variable speed motors, D.C., 220 volts.
- 1—Van Norman No. 4 Internal Grinder with attachments.
- 1—Norton 6" x 30" Plain Grinder with full equipment.
- 4—LeBlond Cutter Grinders with power feed and all attachments.
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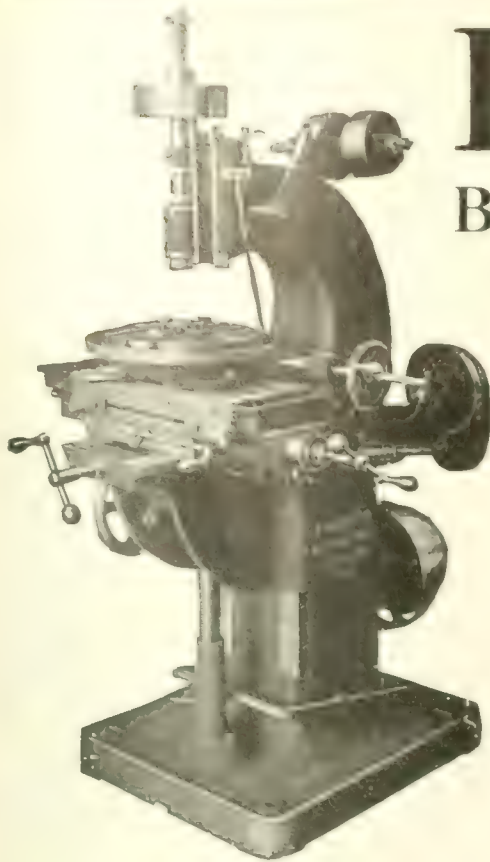
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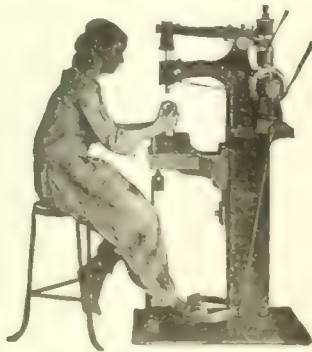
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Six of these, including the Premier himself, have been regular readers of THE FINANCIAL POST for some time.

This does not only indicate the quality as well as the extent of our circulation, but indicates also that men who carry big responsibilities find THE POST of value to them. It indicates, therefore, the approval which is meeting the effort of our editors and the great importance and value of the business information to which subscribers have access through the columns of THE FINANCIAL POST.

When the Government of Newfoundland was recently arranging the flotation of a \$5,000,000 bond issue THE POST'S opinion as regards some methods of marketing was quoted by members of the Cabinet.

The Financial Post at Ottawa

IN the Dominion House of Commons the other week the attention of the Government was drawn to an article in THE FINANCIAL POST containing a reference to the financing of Roumanian orders through an agency established in London by Sir Clifford Sifton. Sir Thomas White mentioned that in reading his FINANCIAL POST that week, he had formed the opinion that the reference was to private marketing of bonds.

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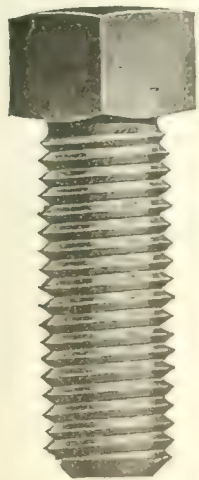
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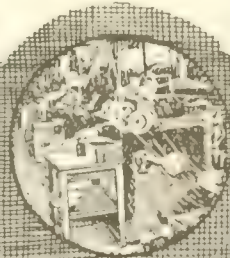
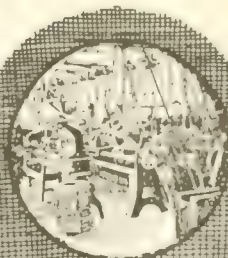
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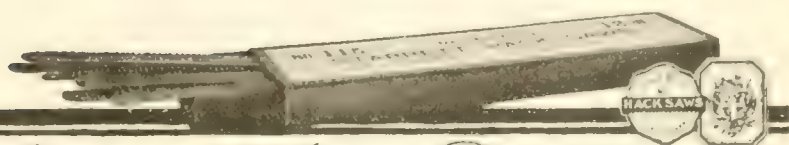
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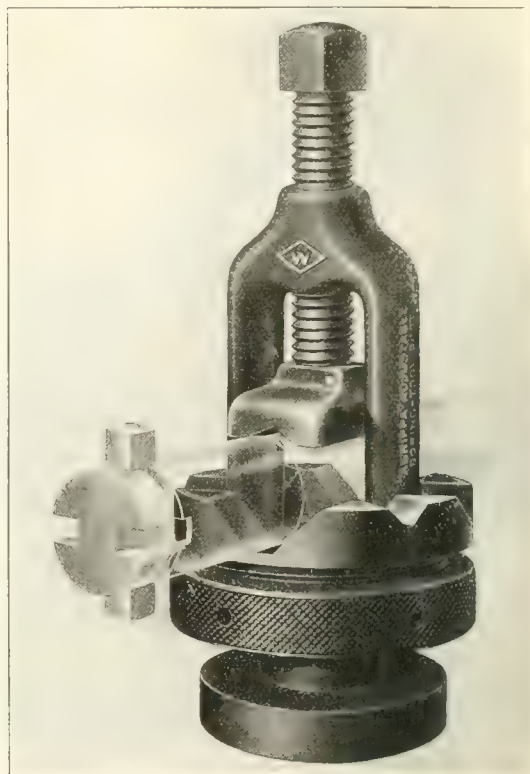
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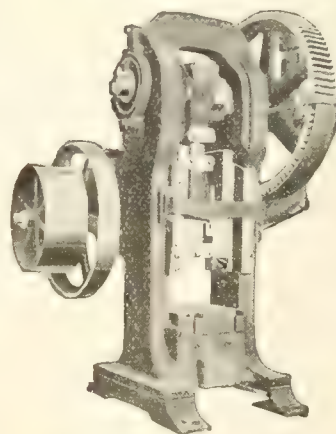
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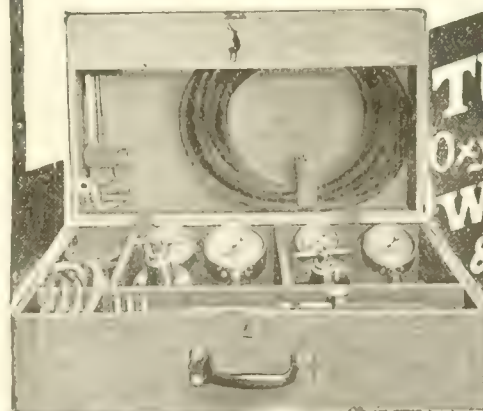
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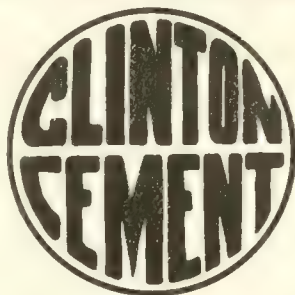
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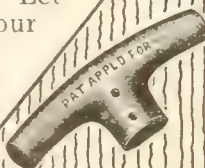
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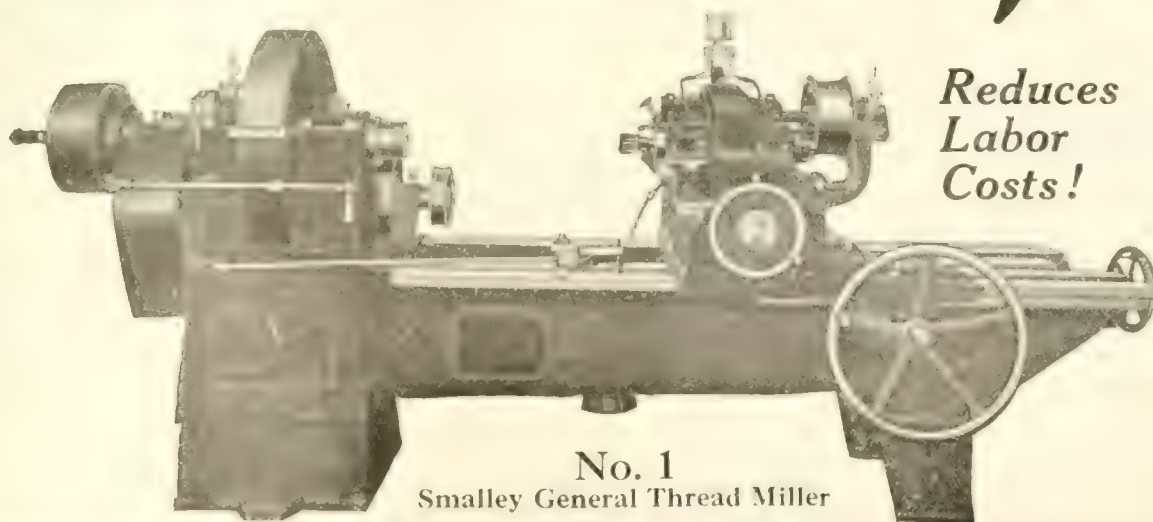
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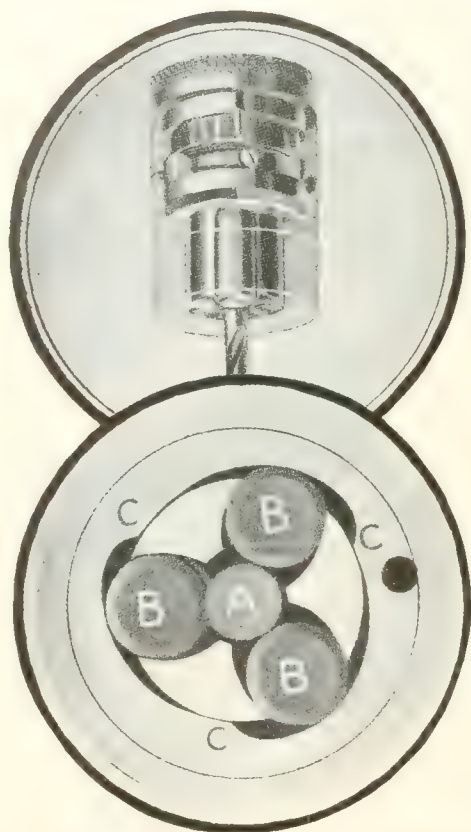
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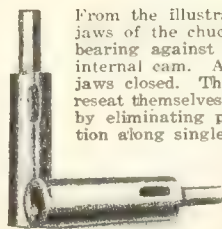
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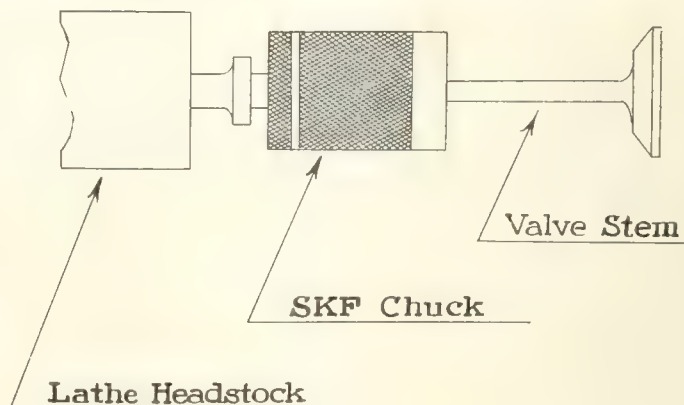
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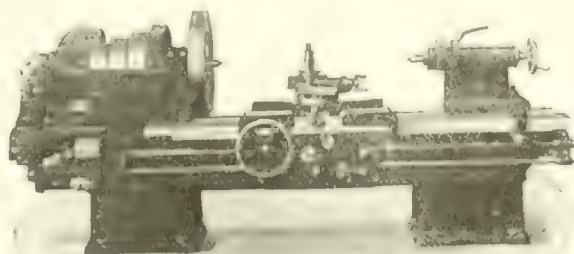
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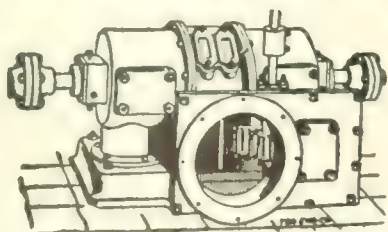
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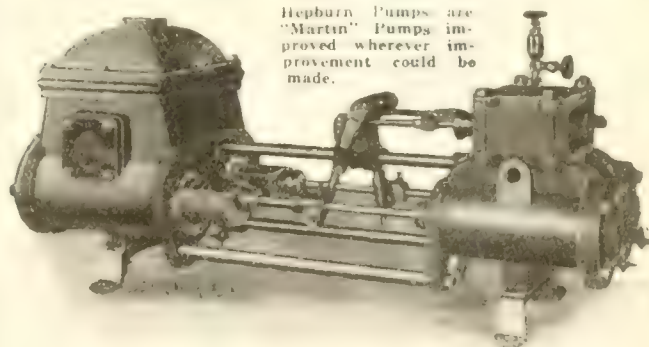
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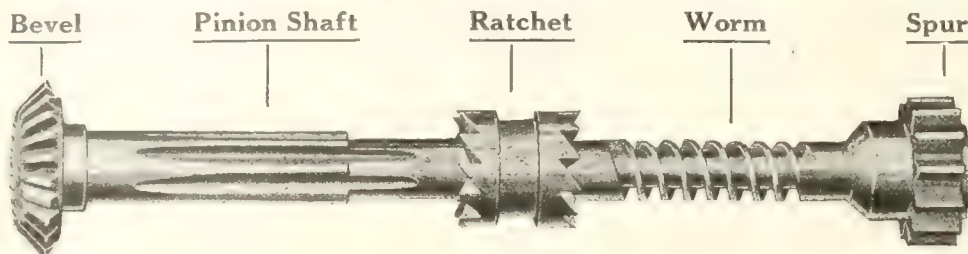
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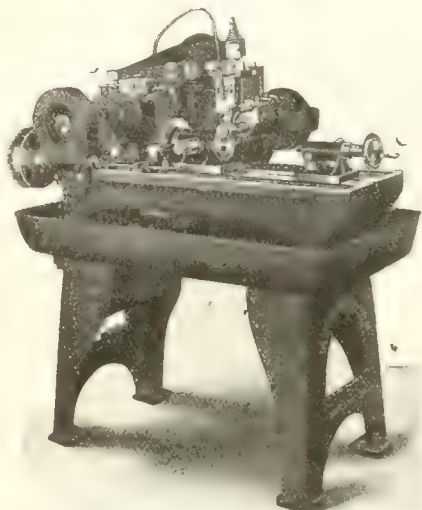
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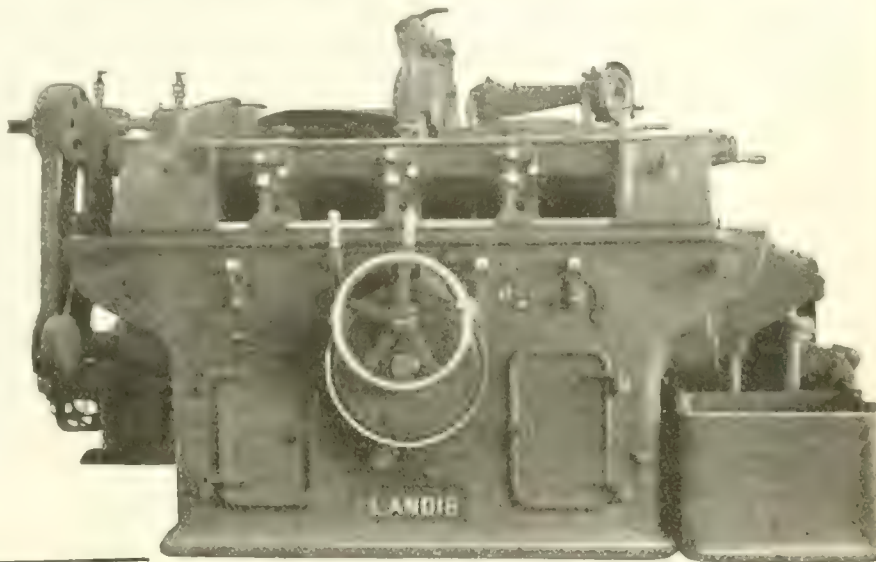
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Faster if the work can be fed faster.
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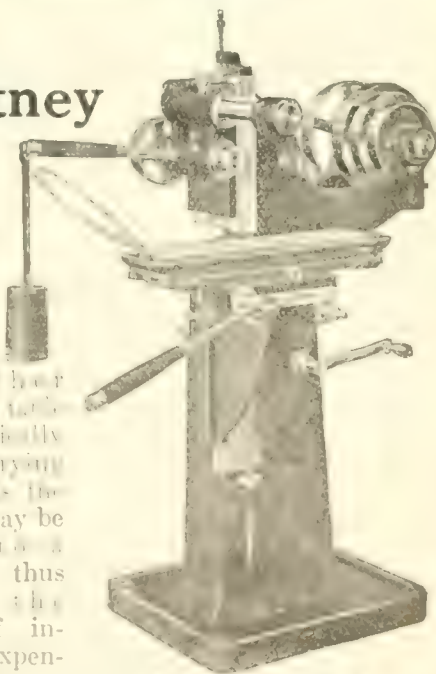
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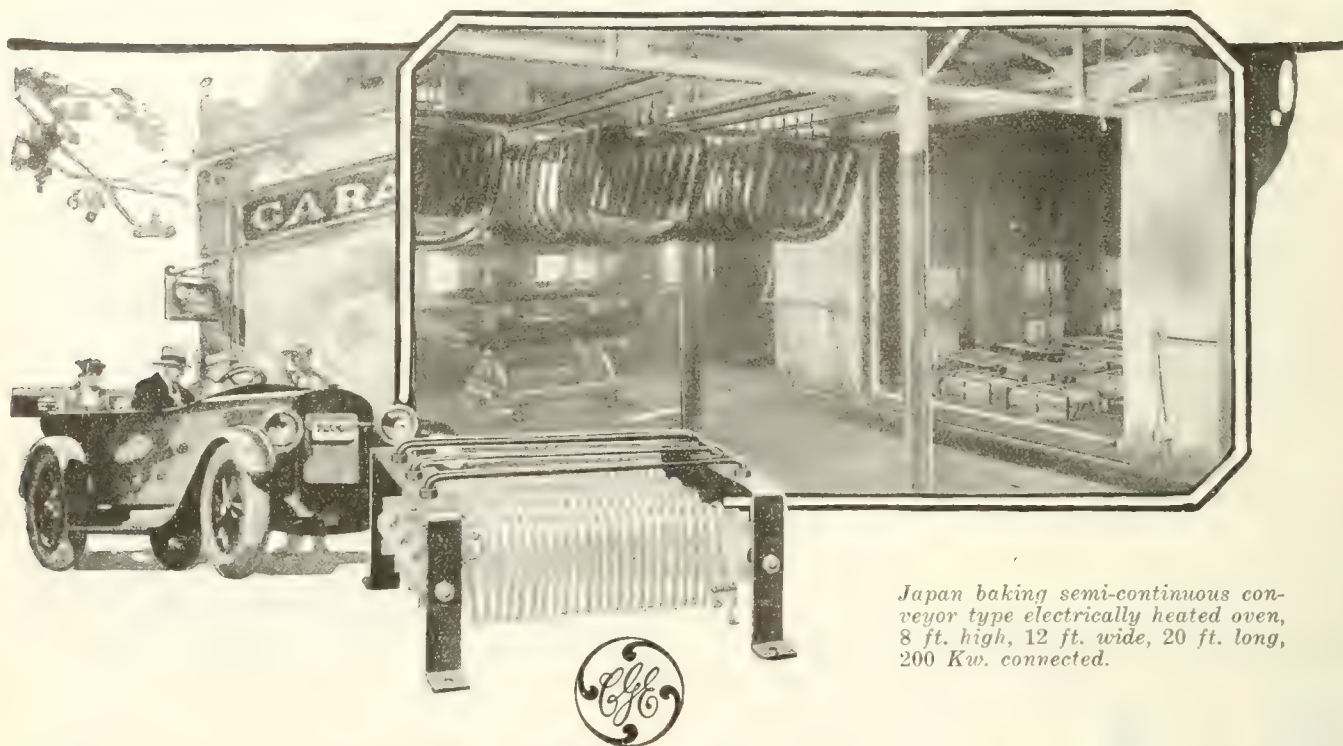


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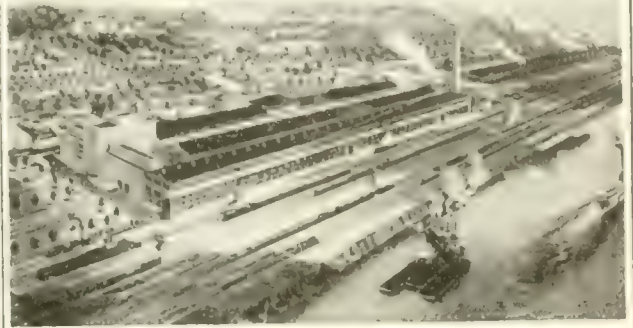
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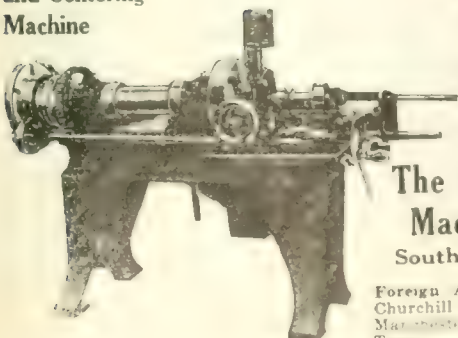
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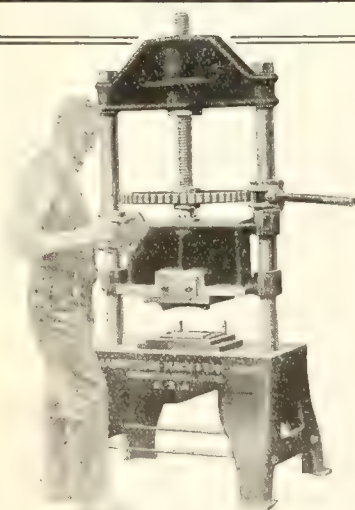
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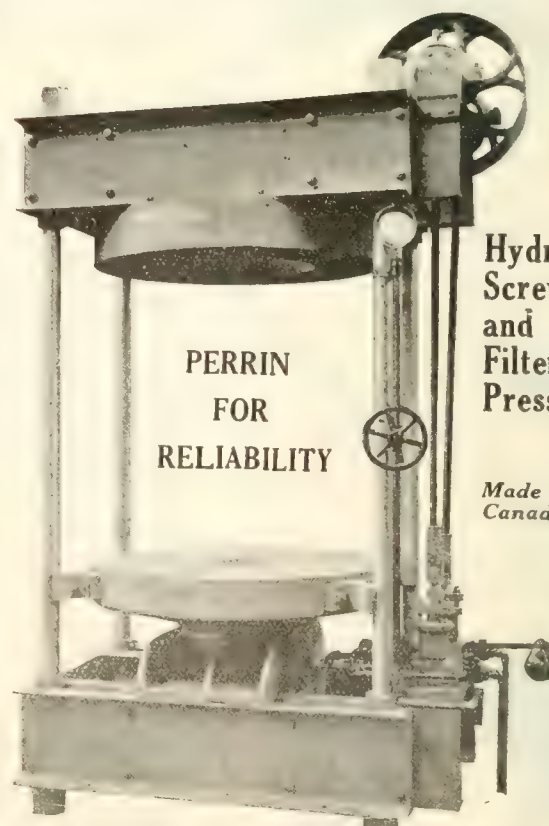
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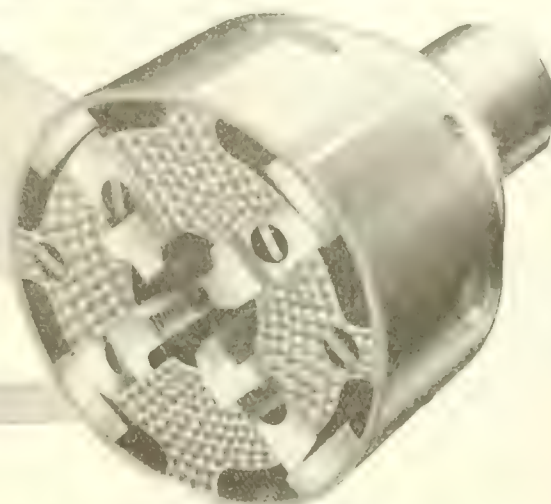
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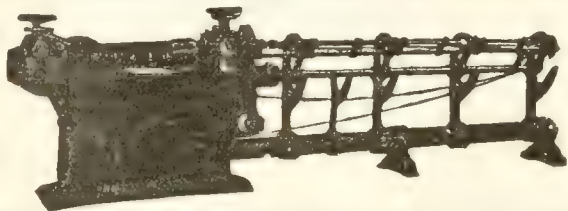
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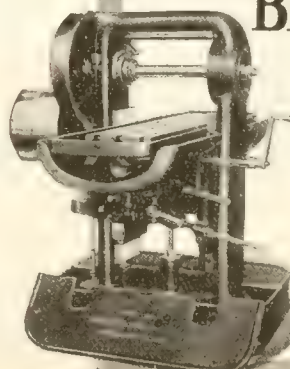


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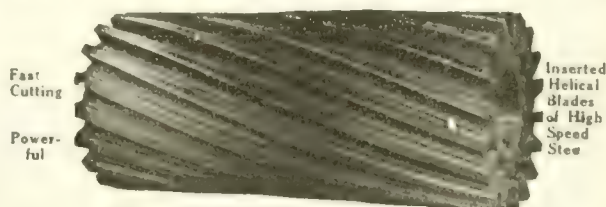
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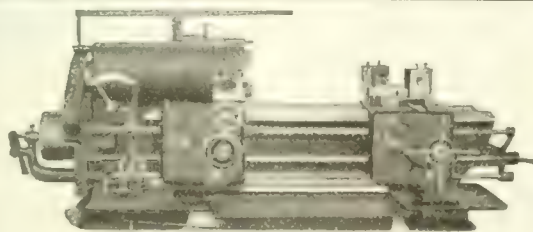
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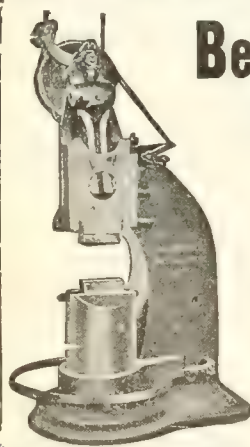
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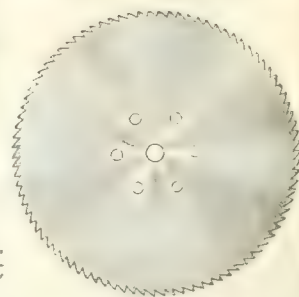
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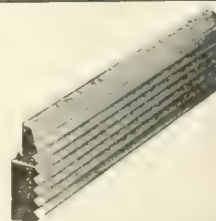
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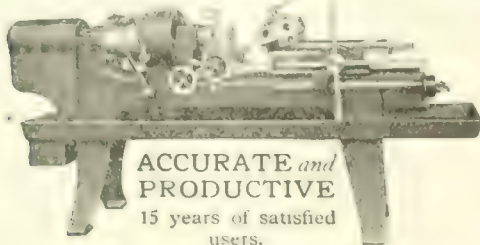


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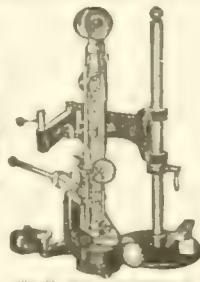
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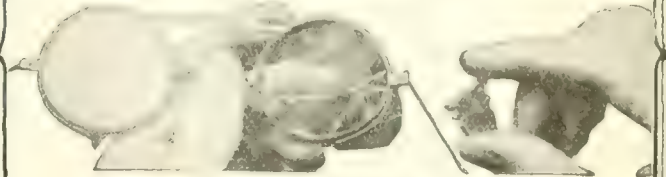


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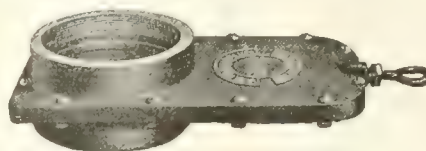
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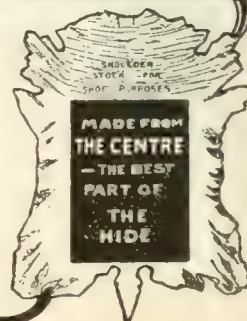
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Janey Canuck—An article on Mrs. Murphy's experiences as the first woman magistrate in the whole of Canada.

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Stephen Leacock—A humorous sketch entitled, "My Memories and Miseries as a School Master."

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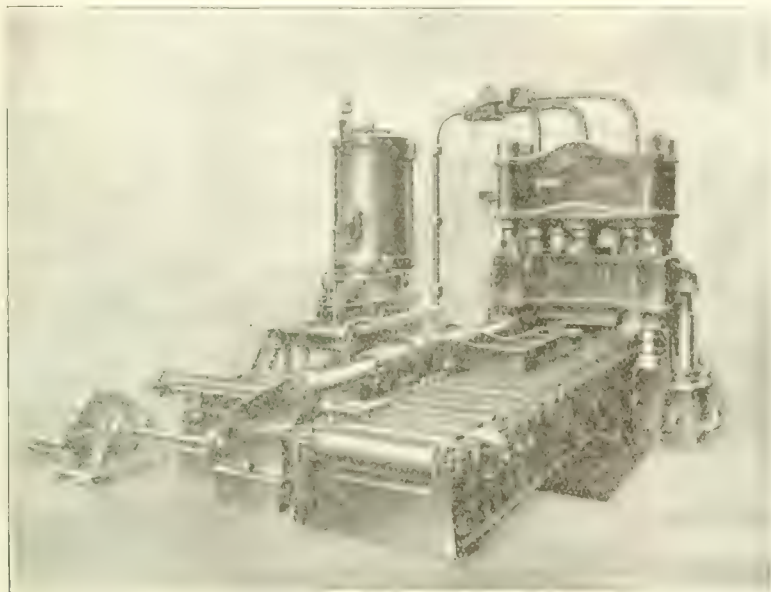
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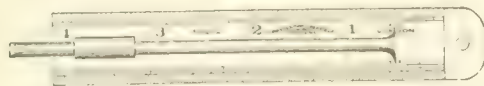
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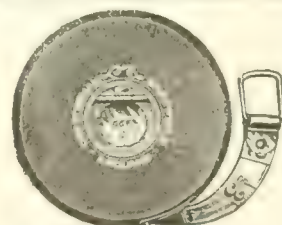
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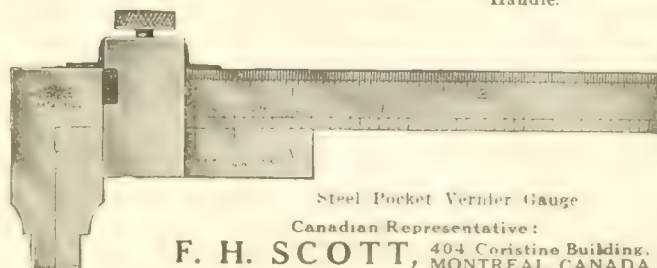
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Brown & Sharpe Mfg. Co., Providence, R.I.
Starratt Co., L. S., Athol, Mass.

INDEX CENTRES

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Duckow First Co., Chicago, Ill.

Ford-Smith Mach. Co., Hamilton, Ont.

Gardner Machine Co., New York.

Williams & Wilson, Limited, Montreal.

INDICATING INSTRUMENTS

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Robertson Co., Ltd., H. H., Samia, Ont.

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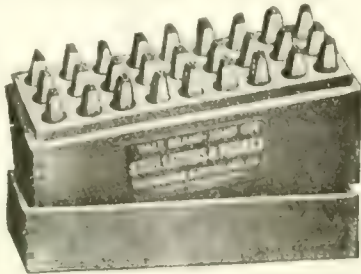
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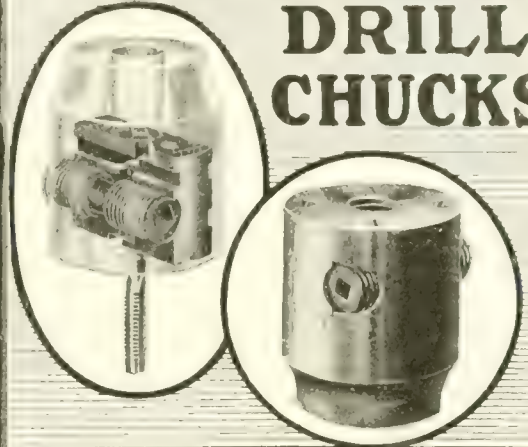


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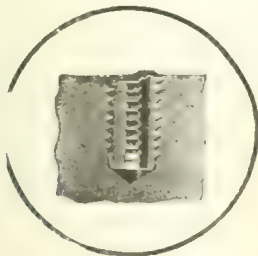


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as easily as you'd pull a cork from a pop bottle.

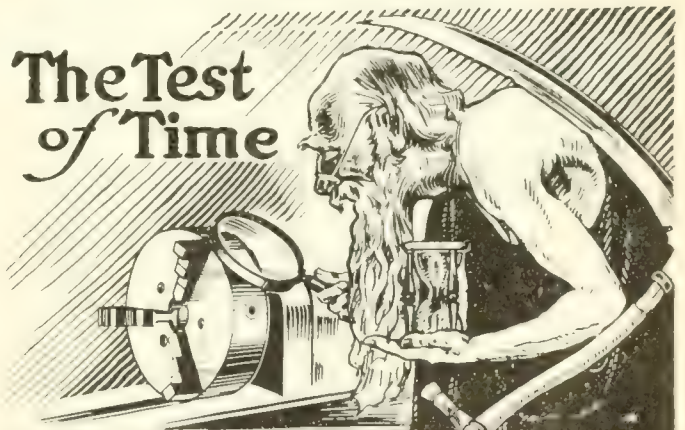
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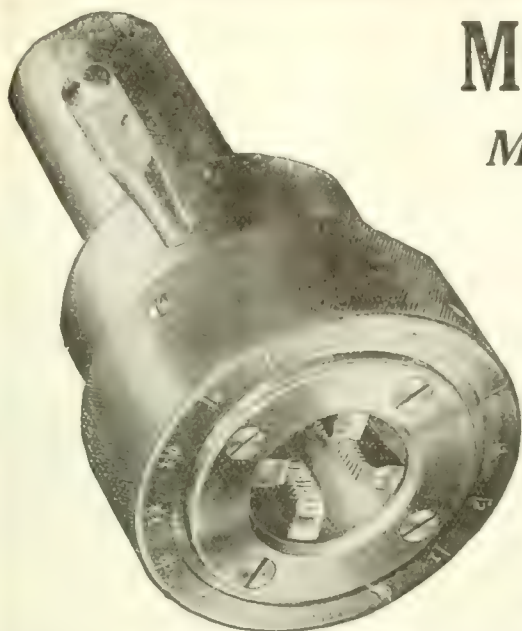
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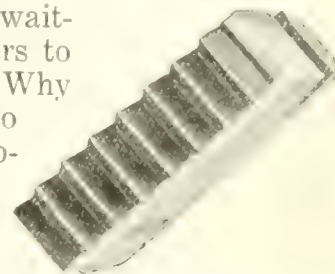
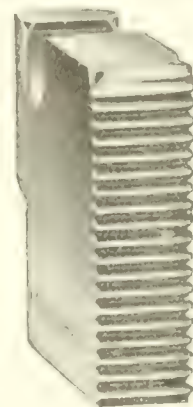
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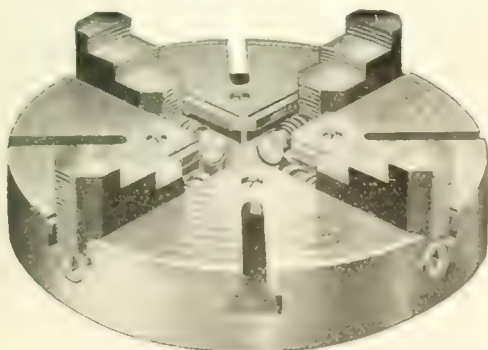
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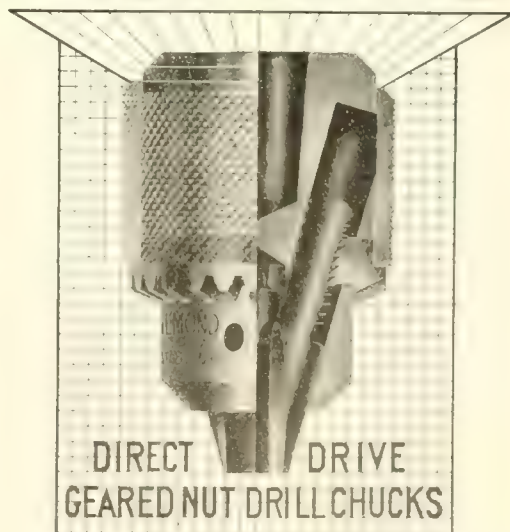
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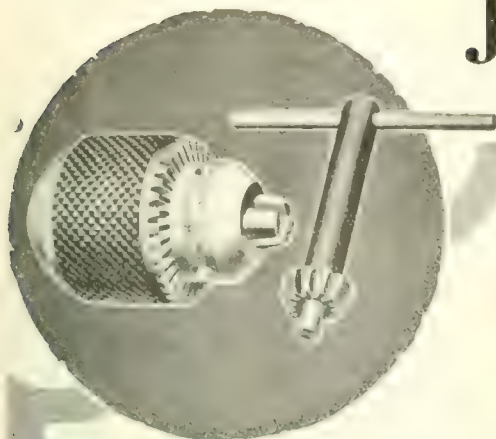
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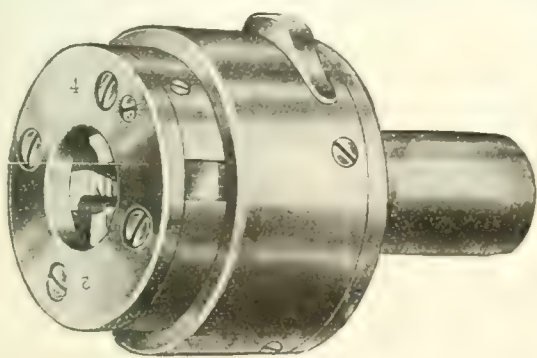


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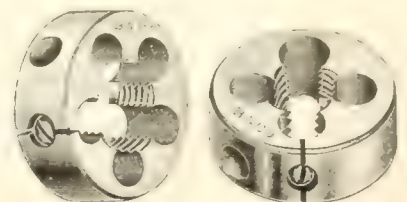
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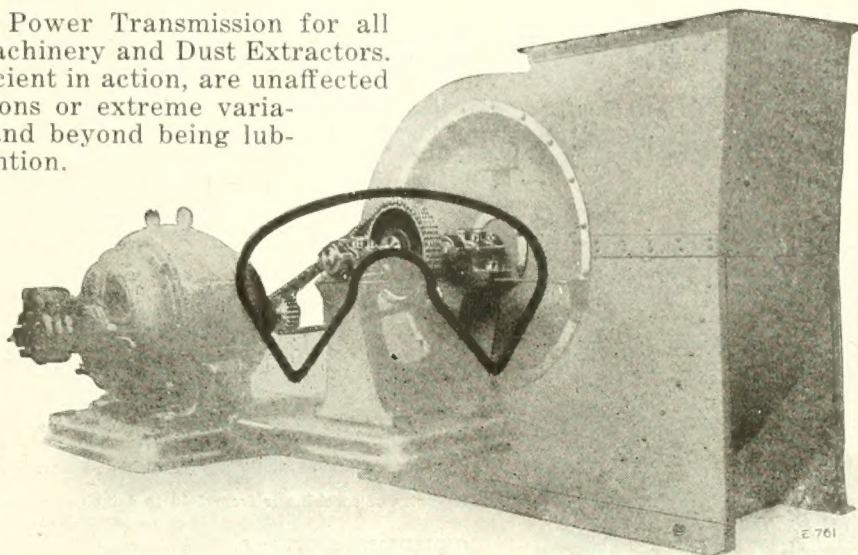
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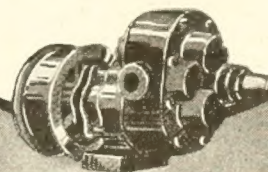
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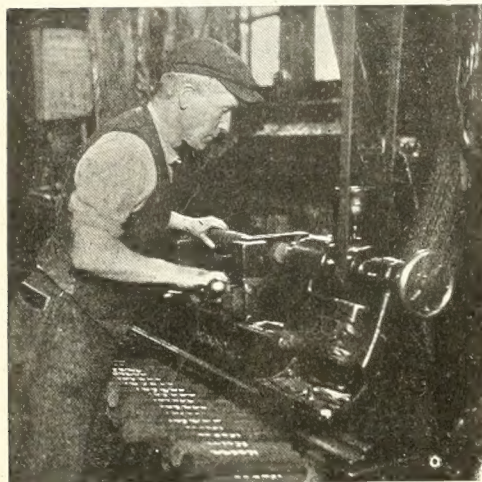
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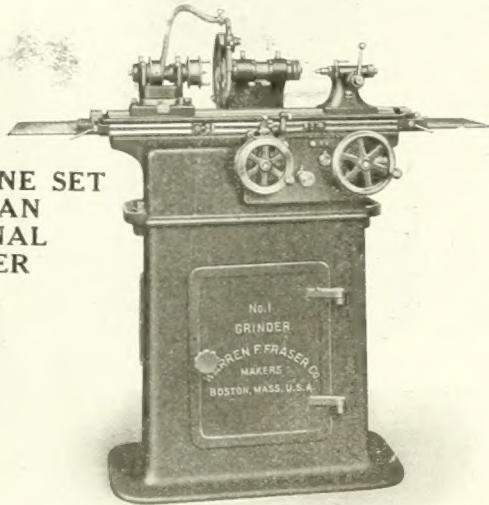
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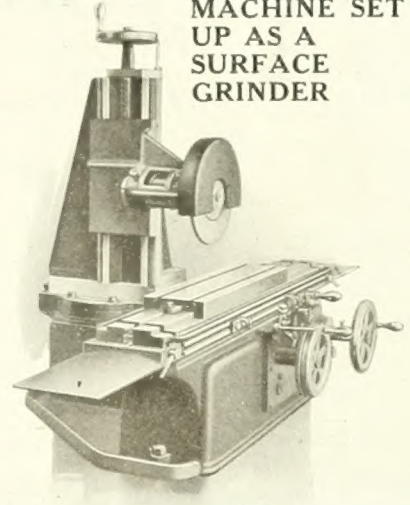
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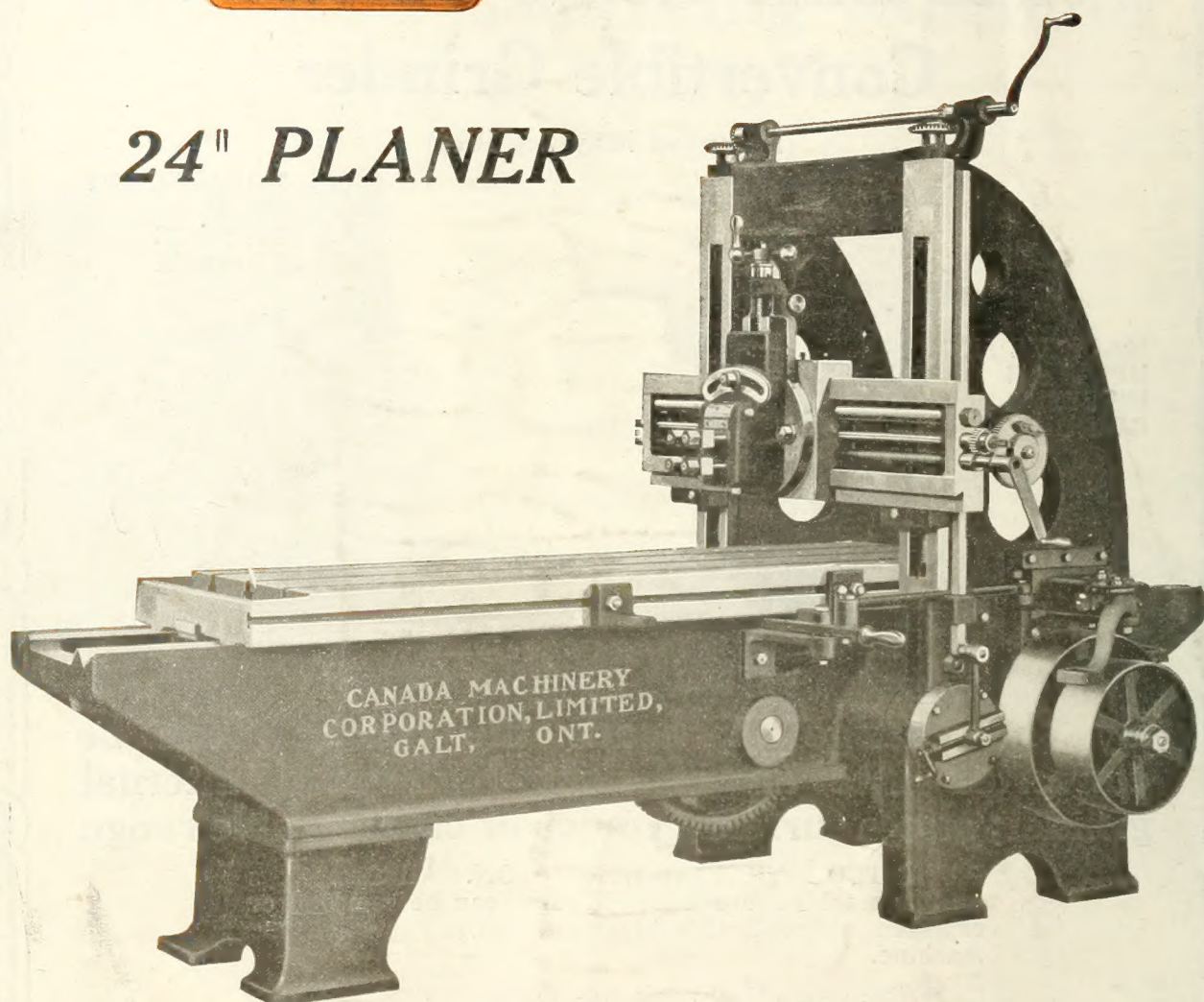
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